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School Dropout and Associations with Anti-social Behaviours: A Bhutanese Study

SONAM GYAMTSHO, J-F, SEYUM GETENET, DARREN PULLEN, AND KAREN SWABEY

This paper explores school dropout and its association with youth crime in Bhutan. The aim was to discover whether students who drop out of school engage in antisocial or criminal behaviours. A total of 158 participants, who dropped out of school, completed a self-designed 14-point questionnaire. The study involved students who dropped out of school from the four districts of Thimphu, Paro, Chukha and Samtse. The study found that students did engage in antisocial behaviours, with more than half of the cohort involved in criminal behaviours and boys engaged in criminal and anti-social behaviours more than girls. Additionally, the study found that more girls dropped out of school than boys. Another key finding was that there was an increase in school dropout at grade 12 and grade 10 level. Contributing factors to school dropout were financial problems, drug use and family, which accounted for over half the cohort.

Keywords: student, school dropout, crime

Introduction
Completion of basic education is a crucial period in everybody’s life. This is the period necessary to acquire basic skills and knowledge useful for future life. Disturbingly, many students drop out (i.e., any student who quits and/or leaves school completely without finishing their study) of schools for various reasons even before completion of basic education level. School drop-out is becoming an increasing problem in Bhutan leading to antisocial crimes. A number of studies by Dorji (2005), Samdrup (2009), Subedi and Nepal (2010), the statistics of the Ministry of Education (2011) and the National Statistics Yearbook of Bhutan (2013) show school dropout as a problem, especially in secondary schools from grades 7 to 10. Students between grades 7 and 10 are dropping out of formal learning in large numbers.

When students drop out of schools, there are multiple damaging consequences on the individual, family, society and government, both in the short and long term. For example, there are direct and indirect cost implications on various stakeholders (UNESCO-UIS, 2012); unemployment and low-status (Tidwell, 1988) amongst many. An important negative outcome is that a majority of these adolescents are likely to engage in anti-social (i.e., behaviour that is contrary to prevalent social norms), maladaptive (i.e., harmful behaviours) and criminal (i.e. illegal behaviours) behaviours. Most juveniles and young people, who engage in anti-social behaviors within urban cities in Bhutan, are known to have dropped out, discontinued or left schoolings (Dorji, 2005). This is very significant because Bhutan has fairly a young population with 59% below the age of 24 years (Tenzin, 2010). Therefore, this paper explores the school drop for when students are likely to leave the schooling system and find out whether dropouts and youth crimes are linked. In this context, it is important to have clear operational definitions for ‘dropout’ and ‘anti-social behaviours’.
**Dropout**

According to UNESCO (1984) school drop-out can be defined as a child who enrolls in a school but fails to complete the relevant level of the educational cycle by suddenly leaving and/or quitting school. In Bhutan, basic education comprises of 11 years of schooling from pre-primary to grade 10, hence, any student leaving school before completion of grade 10, is considered a school dropout. However, for this study, dropout is considered up to grade 12. Although education is free up to the university level, due to a stringent screening process at grades 10 and 12, only top performing students are granted scholarships by the government for further tertiary studies. As a result, students coming from financially disadvantaged families are suddenly out of schools and unemployed. Therefore, this paper looks at school dropout up to grade 12.

**Anti-social, Maladaptive and Criminal Behaviours**

Anti-social (i.e., behaviour that is contrary to prevalent social norms), maladaptive (i.e., harmful behaviours) and criminal (i.e. illegal behaviours) behaviours are behaviours that are deemed as improper, inappropriate and illegal (Sellin, 1938). All of the above can and do attract legal penalties if convicted, for example, the Penal Code of Bhutan states that persons below 18 years can be awarded half the sentence given to adults for criminal offences (Mediamax, 2013). Importantly, The National Youth Policy of Bhutan officially defines young people between the age group of 13 and 24 as Bhutanese youth; therefore, this paper studies antisocial behaviours and crimes committed by youths from 13 to 24 years.

**Literature Review**

Students who drop out of school have an increased risk of engaging in maladaptive and anti-social behaviours and studies suggest that these students are more likely to engage in criminal behaviours, relative to those who complete schooling (Dorji, 2005; Hawkins, Jaccard, & Elana, 2013). Belfield and Levin (2007) argued that out of school youths are more likely to commit crimes than their graduate counterparts; based on this premise, this study explored whether those individuals who drop out of school engage in antisocial and/or criminal behaviours, within the context of Bhutan. Unfortunately, school dropout is becoming a problem in Bhutan and appears to be associated with antisocial behaviours and criminality (Dorji, 2005). Further, students who drop out of school within a Bhutanese context not only miss out on much needed formal learning, but are equally at the risk of greater educational and social disadvantage, as they are no longer actively involved in productive, constructive or learning endeavours. This is a concern as Bhutan’s population is largely under 24 years of age of (59%) (Tenzin, 2010). One of the difficulties within the context of Bhutan is not knowing to what extent those individuals who drop out of school engage in antisocial behaviours and/or commit crimes. Importantly, very few studies are available in Bhutan with regards to the particular reasons for increases in school dropout (Dorji, 2005; Subedi & Nepal, 2010). Furthermore, very little is known as to the precise reason for students dropping out of schools. Against this backdrop, this study explored to what extent individuals who drop out of school engage in crime and/or antisocial behaviours.

Although, school dropout seems to be prevalent in Bhutan and while at a superficial level it may appear to be somewhat on the decline, dropout rates are dramatically higher at the secondary school level (Ministry of Education, 2011; National Statistics Year Book of Bhutan (NSYBB, 2013). Studies have found
that a great number of students are likely to drop out especially in secondary schools from grades 7 to 10 (Dorji, 2005; Ministry of Education, 2011). It is claimed that students in grades 7 to 10 from difficult backgrounds, complicated family circumstances and negative school experiences are at a greater risk of dropping out of school than their Bhutanese counterparts (Dorji, 2005). Further, Ministry of Education (2011) found that a total of 16.9% (N= 4,616 students from grades 7 to 10) of students dropped out of school whilst the National Statistics Year Book of Bhutan (2013) reported that from 4172 students in grades 7 to 10 around 8.20% were school dropouts. This is an alarming number of students missing out on formal education. Thus, exploring reasons for this increase through the voices of those students who dropped out of school is necessary as it will give detailed insights into the reasons for the increase and what factors contributed towards them having to drop out of school, especially when education is free in Bhutan.

A study in Bhutan by Subedi and Nepal (2010) on school enrollment and retention from 2005 to 2008, found the net enrollment to decrease with increasing levels of school education, with 22% at lower secondary schools (grades 7 and 8) and 16% at middle secondary schools (grades 9 and 10) and that 30% to 35% children do not complete basic education and likely to miss out on much needed civic and moral education with regard to life skills. These findings indirectly assert that either students are not continuing secondary education or dropping out of school as they progress through the higher grades, especially at lower secondary and middle secondary level.

Another study by Dorji (2005) in Bhutan found that most juveniles and young people, who engaged in anti-social behaviours within urban cities and rural sites in Bhutan were school drop outs who had abruptly discontinued schoolings. The study used police records on youth crimes and mainly concentrated on rural youth with some urban youth (random sample of 942 youths) who were school dropouts and un-educated youth from 12 Bhutanese districts. This study found that over 400 were school dropouts and the rest never enrolled in any formal education. Dorji (2005) documented a list of reasons for dropout, but the two most significant factors were financial and family problems. Two limitations of the study were that age and gender were not provided making it difficult to clearly identify the cohort. Further, Dorji (2005) did not provide a link that those students who dropped out of school always engaged in crime. This finding indirectly suggests that those students who dropped out of school are at a greater risk of engaging in anti-social behaviours and/or crime. For instance, a study carried out in California showed that high school dropouts were two to eight times more likely to commit criminal acts than high school graduates (Belfield & Levin, 2007).

Eddy and Reid (2001), and Patterson, Capaldi, and Bank (1991) implied that students who dropped out of school were more prone to engaging in delinquent and antisocial behaviours leading to crime. While not all students who drop out of school are likely to engage in anti-social and criminal behaviours as some students may take up employment and work rather than continue education, it is still argued that students are still at the risk of engaging in anti-social behaviours. To this end, Merloy and Wolpinz (2009) argued that work during much needed education time is likely to have negative outcomes as students are likely to miss out moral and civic principles, and further that it is also likely to expose students to antisocial behaviour and that in some cases, leading to criminal activity. Being in school and continuing secondary education appears to be a protective factor. Harmacek, Gonzales, Richard, and Seeley (2002) conducted a longitudinal
study over a 30 year period in St. Louis, Colorado and found that there was a connection between youth out of school and adult criminality with 89% of reported school truants committing some form of anti-social or criminal behaviour. Likewise, Battin-Pearson et al. (2000) suggested that there is a link between adolescent delinquency in terms of engaging in drug and alcohol use, smoking and sexual involvement and nonacademic performance due to school dropout.

A number of factors are claimed to contribute toward school dropouts, such as poor academic performance, dislike of school, expulsion, desire to work, financial problems, home responsibilities, teenage pregnancy, marriage problem, grade retention, motivation, lack of teacher support, substance abuse, lack of family and school support, lack of knowledge and understanding of the gravity of the crime, unemployment, repeating grades and over age of students (Battin-Pearson et al., 2000; Drewry, 2007; Freudenberg & Ruglis, 2007; Lund, 2009; Mediamax Consultancy, 2013; Tidwell, 1988; UNESCO-UIS, 2012). Although, the aforementioned studies make notable findings, they do not capture the voices of the students, or confirm what factor in particular leads one to drop out of school in terms of their variance, or how much a factor independently accounts for dropping out of school and they also do not show the varied consequence of students dropping out of school. Furthermore, others studies on school dropout take a top down approach of exploring organizational characteristics such as teachers, school systems, societal characteristics (e.g., family and community) and do not explore student voices and the effects of school dropout on themselves, hence, the current study attempts to answer and fill these gaps for a Bhutanese context (Eddy & Reid, 2001; Freudenberg & Ruglis, 2007).

Context of the Study
The current study extends the finding of Dorji (2005) to directly capture the voices of students who dropped out of schools. No study has been undertaken in Bhutan to capture the voices of students who have dropped out of school making the current study unique and significant for Bhutanese judicial and education systems. This particular study was primarily concerned about what factors led students to drop out of school, and then to investigate what percentage of those that dropped out engaged in antisocial behaviours. Equally, the study was interested in exploring whether school dropouts increased over the years or level of education (i.e., secondary or primary school). Consequently, the study aimed to recruit school dropouts from different regions and locations and these places were randomly selected to get a broader perspective from varied student backgrounds. Documenting the voices of those that have dropped out of school not only is likely to validate the findings but equally avoids confounds, inferences and speculations from organizational characteristics (Eddy & Reid, 2001; Freudenberg & Ruglis, 2007).

Methodology
Participants
A total of 158 (118 males and 40 females) participants took part in the study. Participants were from four Youth Development Centers [Treatment and Rehabilitation Centre for Drug and Alcohol Dependence (Thimphu District, n= 8), Nazhoen Pelri Drop-In Centre (Thimphu District, n=59), Nazhoen Pelri Phuntsholing, Chukha District, n=47), Samzang Retreat Centre (Paro District, n=14)], one Detention Center [Youth De-
velopment and Rehabilitation Centre (Chukha District, n=22) and a Community Bazaar (Samtse District, n=8). All the regions and the centers were randomly selected for the convenience of the Researcher. The age range of the participants was from 13 to 44 years, with a mean age of 22. Out of the 158 participants, 22 (males) were inmates serving sentences for Index Offences (i.e., reason for current conviction and incarceration) and the other 136 (102 males and 34 females) participants were living in the community.

Design
Similar to Dorji’s study (2005), this study also adopted a survey design. The Researcher initially contacted the respective Centers and sought approval and consent to visit centers and to recruit participants. The Researcher visited six different centers and explained to the participants the nature of the study and that it had met with their Departmental Consent and Ethics approval. Participants were informed that the purpose of the study was to capture their voices with regards to them dropping out of school; that the study was particularly interested in capturing factors that led them to drop out of school, and whether they engaged in any antisocial behaviours.

Participants were also informed that their participation would be voluntary and that there was no incentive, reward or remuneration for their participation. In addition, the Researcher informed participants that no identifiable information would be collected and that they could opt out of the study at any time. After these instructions, time was given to participants to ask questions or to seek clarification. Not knowing the education levels of participants, information to participants was given verbally, and information was read out rather than requiring participants to read. After providing all the information verbally, the Researcher presented the survey to the participants; all of the participants completed them individually and it took on average 20 minutes to complete the survey. The Researcher was present when participants were completing the survey. No identifiable information was collected on the survey. All participants completed the survey and where appropriate, they provided quantitative and qualitative responses. After completing the survey, each of the participants returned the survey to the Researcher.

Measures
Using Dorji’s (2005) six questions of inquiry, a 14 item survey was developed. This survey had 3 qualitative and 11 quantitative questions. Three qualitative questions 6, 13 to 14 were: 6, please mention reasons for dropping out of school; 13, what do you intend to do after you leave center, and 14: comment on how the school could have assisted you not to drop out of school. Quantitative questions included: age, gender, highest level of education completed, school dropout (yes/no), year of dropout, job (yes/no), age at the start of employment, age of first offence, nature of offence, total number of offences, penalty received.

Data Analysis
Quantitative data around demographic details were presented through descriptive statistics using SPSS and qualitative data analysis aimed to explore unique themes among participants; but only Quantitative data was analyzed for this study and results were formulated using a frequency via Software Package used for Statistical Analysis (SPSS) (2014). Results are reported in line with the research questions and in terms of descriptive information as to how many dropped out of school, factors that led them to drop out of school
and whether they engaged in antisocial behaviours. In addition, increase in school drop was analyzed at the grade level. Given the scope of current investigation, this study does not report on responses from items 6, 13 and 14 as they are beyond the scope and the focus of the current study. Consequently, this study only reports descriptive analysis to capture and quantify the nature of school dropout with regard to those that have dropped out and their associations with antisocial behaviours and crime.

Results

School Dropout and School Dropout As Per Gender

Participants reported that they had dropped out of school during the time period of 1984 to 2014 and at all levels of education starting from grade 1 to grade 12. Importantly a significant number 75.3% (n=119) reported that they had dropped out of school, with over 90% (n=36) of females dropping out of schools and with over 70% (n=83) of boys reporting of dropping out of schools, girls appear to drop out at a higher rate than boys. Further, in terms of the number of students dropping out at the secondary level, the highest was at grade 12 accounting for 31.6% (n=50) of dropout, followed by grade 10 accounting for 22.2% (n=35) of drop out and together secondary school dropouts accounted for over 78.5%, as shown in Table 1.

**Table 1 Number of Students Dropping Out Grade**

<table>
<thead>
<tr>
<th>Grade Level</th>
<th>Number of Participants</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 1</td>
<td>1</td>
<td>.6</td>
</tr>
<tr>
<td>Grade 2</td>
<td>1</td>
<td>.6</td>
</tr>
<tr>
<td>Grade 3</td>
<td>2</td>
<td>1.3</td>
</tr>
<tr>
<td>Grade 4</td>
<td>1</td>
<td>.6</td>
</tr>
<tr>
<td>Grade 5</td>
<td>4</td>
<td>2.5</td>
</tr>
<tr>
<td>Grade 6</td>
<td>11</td>
<td>7.0</td>
</tr>
<tr>
<td>Grade 7</td>
<td>8</td>
<td>5.1</td>
</tr>
<tr>
<td>Grade 8</td>
<td>9</td>
<td>5.7</td>
</tr>
<tr>
<td>Grade 9</td>
<td>12</td>
<td>7.6</td>
</tr>
<tr>
<td>Grade 10</td>
<td>35</td>
<td>22.2</td>
</tr>
<tr>
<td>Grade 11</td>
<td>10</td>
<td>6.3</td>
</tr>
<tr>
<td>Grade 12</td>
<td>50</td>
<td>31.6</td>
</tr>
<tr>
<td>No Response</td>
<td>14</td>
<td>8.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>158</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

School dropouts by year

In terms of the increase in school dropout rates over the years, a total of 59.6% reported dropping out of school over the last seven years, indicating the school dropout increased since 2007, as shown in Table 2.
In terms of the reasons for dropping out of school, a total of 75.3\% of participants mentioned 22 different reasons for dropping out of school, while 24.7\% (n=39) did not state any particular reason for dropping out of school. The most significant reasons for dropping out of school were financial problems 18.4\%, followed by drug abuse 17.1\% and then family problems 14\%. Overall, financial problems, drug use and family accounted for 54\% of school dropouts. The summaries of reasons for dropouts are shown in Table 3.

### Table 3 Reasons for Participants Dropping Out of School

<table>
<thead>
<tr>
<th>Reasons</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial</td>
<td>17</td>
<td>3</td>
<td>39</td>
<td>18.4</td>
</tr>
<tr>
<td>Drugs abuse</td>
<td>23</td>
<td>4</td>
<td>27</td>
<td>17.1</td>
</tr>
<tr>
<td>Family</td>
<td>14</td>
<td>8</td>
<td>22</td>
<td>14</td>
</tr>
<tr>
<td>Alcoholism</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>2.5</td>
</tr>
<tr>
<td>Fight</td>
<td>4</td>
<td>-</td>
<td>4</td>
<td>2.5</td>
</tr>
<tr>
<td>Not interested in studies</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>2.5</td>
</tr>
<tr>
<td>Parents’ divorce</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>2.5</td>
</tr>
<tr>
<td>Parents pressure/option</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>2.5</td>
</tr>
<tr>
<td>Antisocial problem</td>
<td>2</td>
<td>-</td>
<td>2</td>
<td>1.3</td>
</tr>
<tr>
<td>Discipline problem at school</td>
<td>2</td>
<td>-</td>
<td>2</td>
<td>1.3</td>
</tr>
<tr>
<td>Lack of family &amp; school support</td>
<td>2</td>
<td>-</td>
<td>2</td>
<td>1.3</td>
</tr>
<tr>
<td>Pregnancy</td>
<td>-</td>
<td>2</td>
<td>2</td>
<td>1.3</td>
</tr>
<tr>
<td>Expulsion from school</td>
<td>2</td>
<td>-</td>
<td>2</td>
<td>1.3</td>
</tr>
<tr>
<td>Problem with teachers</td>
<td>2</td>
<td>-</td>
<td>2</td>
<td>1.3</td>
</tr>
<tr>
<td>Disqualified for higher studies</td>
<td>2</td>
<td>-</td>
<td>2</td>
<td>1.3</td>
</tr>
<tr>
<td>Citizenship</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>Ran away from home</td>
<td>-</td>
<td>1</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>Burglary</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>0.6</td>
</tr>
</tbody>
</table>
Health | 1 | - | 1 | 0.6
Repetition | 1 | - | 1 | 0.6
Personal reason | 1 | - | 1 | 0.6
Poor in studies | - | 1 | 1 | 0.6
No response | 36 | 3 | 39 | 24.7
Total | 121 | 37 | 158 | 100

Dropout and Antisocial Behaviours

In terms of participants engaging in antisocial behaviours, a total of 57.6% (n= 91) reported committing a criminal offence, with less than 19.6% (n=31) reporting that they did not commit any crime, and 22.8% (n=36) chose not to respond. Further, around 68% of boys engaged in criminal behaviours compared to only 22.5% of girls, but a total 60% of the cohort engaged in crime, see Table 4. However, it appears that only a small number of participants who dropped out of school did not commit crimes as shown in Table 5.

Table 4 Crimes Committed per Gender

<table>
<thead>
<tr>
<th>Sex</th>
<th>No Response</th>
<th>Commit a crime</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Male</td>
<td>13</td>
<td>81</td>
</tr>
<tr>
<td>Female</td>
<td>21</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>34</td>
<td>90</td>
</tr>
</tbody>
</table>

Figure 2. Number of Participants Who Committed a Criminal Act
Nature of crimes committed by participants

Importantly, 13 different crimes were committed by participants amongst which, fighting 26.6% and drug abuse 13.9% were the highest. More importantly, over 47.4% accounted for serious crimes (e.g., fights, burglary, rape, battery, vandalism, robbery, murder and volunteer manslaughter). Participants reported that they received various types of penalties for their crimes such as imprisonment from 3 months to 14.6 years, police detention, school expulsion, and other forms of punishment from the school. The summary of the nature of crimes committed by participants is shown in Table 6.

Table 5

<table>
<thead>
<tr>
<th>Nature of Crime</th>
<th>Number of Participants</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fight</td>
<td>42</td>
<td>26.6</td>
</tr>
<tr>
<td>Drugs abuse</td>
<td>22</td>
<td>13.9</td>
</tr>
<tr>
<td>Burglary</td>
<td>10</td>
<td>6.3</td>
</tr>
<tr>
<td>Drinking</td>
<td>9</td>
<td>5.7</td>
</tr>
<tr>
<td>Rape</td>
<td>7</td>
<td>4.4</td>
</tr>
<tr>
<td>Battery</td>
<td>6</td>
<td>3.8</td>
</tr>
<tr>
<td>Vandalism of stupas</td>
<td>4</td>
<td>2.5</td>
</tr>
<tr>
<td>Robbery</td>
<td>3</td>
<td>1.9</td>
</tr>
<tr>
<td>Stealing</td>
<td>2</td>
<td>1.3</td>
</tr>
<tr>
<td>Murder</td>
<td>2</td>
<td>1.3</td>
</tr>
<tr>
<td>Indiscipline</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>Volunteer manslaughter</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>No response</td>
<td>49</td>
<td>31.1</td>
</tr>
<tr>
<td>Total</td>
<td>158</td>
<td>100</td>
</tr>
</tbody>
</table>

Age at First Offence

Ages for first offence ranged from 11 to 25 years. However, the years between 14 and 19 accounted for 29% of the crimes for the majority of the offending and antisocial behaviours. More specifically, the significant number of crimes committed were by 16 years old participants which accounted for 12.7 % (n= 20), followed by 18 year olds which account for 10.1% (n=16) and finally 17 year olds accounting for 7% (n=11). These results directly correspond to grade 7 through to 12. Specifically, 40 participants aged between the ages of 14 and 16 years committed 40 first time offences, followed by 37 participants who were between the ages of 17 to 19 years.

Discussion

This study confirmed the notion stated by Belfield and Levin (2007) that out of school individuals are likely to commit crimes; this finding is in line with Hawkins et al. (2013) and Dorji (2005). With the exception of only a small number of participants, irrespective of grades (i.e., ages 14 to 19) the majority of participants who dropped out of school engaged in antisocial and criminal behaviours. While there was a significant number of girls who dropped out of school, boys engaged more in antisocial and criminal behaviours than
It can be argued that if these participants (i.e., boys) remained at school, they would be more likely to be involved in constructive and learning activities and less likely to be involved in anti-social behaviours (Dorji, 2005).

This study also confirmed the findings of Subedi and Nepal (2010) as it found a significant number of school dropouts at the secondary school level. Further, in line with the findings of Subedi and Nepal (2010), this study found an increase in school dropouts over the last seven to eight years, it is unclear as to the reasons for this sudden increase and this needs to be further investigated in future studies. Importantly, in terms of factors associated with school dropout, this study confirmed the findings of previous studies and documented various individual and psycho-social factors associated with students dropping out of school (Battin-Pearson et al., 2000; Drewry, 2007; Freudenberg & Ruglis, 2007; Lund, 2009; Mediamax Consultancy, 2013; UNESCO-UIS, 2012; Tidwell, 1988). Of the many reasons such as alcoholism, antisocial problems, citizenship problems, discipline problems at school, ran away from home, burglary, lack of family and school support, health, fights, grade repetition, pregnancy, expulsion, personal reasons, problems with teachers, not interested in studies, parents’ divorce, parental pressure, and poor in studies; this study found the most significant reasons for dropping out of school were: financial problems, followed by drugs and family problems (Dorji, 2005; Tidwell, 1988; UNESCO-UIS, 2012). However, unlike previous studies, this study did not find school related or education related factors to be significantly associated with school dropout.

With regard to financial problems, it was unclear, where this problem lies (e.g., poverty, family being unable to support the student or student being expected to financially support their family/community) as education is free in Bhutan. Perhaps, there are other indirect costs involved in schooling such as uniforms, shoes, books, travel, incidental costs and food. Such expenses are likely to add burden on already economically struggling families. Or perhaps, poverty in a more general sense is a significant contributing factor over and above indirect expenses, and this needs to be further explored in future studies.

In studying school dropout, more attention must be given to the indirect costs and whether they are institutional financial barriers toward attending schooling. With regard to drug abuse, Bhutan has a policy that drug abuse is a crime; perhaps participants were possibly convicted and/or incarcerated for possible drug use/abuse, depending on the severity of the offence and consequently dropping out of school. In terms of family related problems perhaps parental divorce, alcoholic father or mother, negligence and lack of support could account for school dropout, but this again needs to be followed up by future studies in terms of how they are measured and associated.

The current study found that participants of school age between 14 to 19 years of age engaged in a variety of criminal behaviours. For instance, around half of participants committed serious offences and these findings are in line with Battin-Pearson et al., (2000); Dorji (2005); Eddy and Reid (2001); Harmacek, et al., (2002) and Patterson et al. (1991). While, it is unclear as to the precise reasons which led participants to engage in such horrific crimes and antisocial behaviours, it is very clear that a majority of them engaged in criminal behaviours. Hence, urgent measures need to be put in place both at a systems level and at a school level to address school dropout and its negative implications. Furthermore, given that Bhutan is a relatively small country, such continued criminality by young people is a social and economic burden and
has far greater implications for the victims, society and country at large. A unique part of this study was that participants were of varying ages (13 to 44 years of age) and from different backgrounds and experiences. A strength of the study was that it directly documented and captured the experiences of participants, who were themselves school dropouts. However, caution must be exercised in generalizing the findings, even though data was randomly collected from four different districts of Bhutan, it may not be an accurate representation of the wider population. Furthermore, the survey instrument for this study was primarily developed from Dorji’s (2005) study and hence it was limited in its conceptual and methodological application with relevance to exploring the variance of each factor contributing toward school dropout. In addition, this survey failed to ask participants, when they committed their first offence (i.e., precise age) and how it was related to them dropping out of school. This link is vital as it could have provided a more critical insight as school dropout was directly correlated to antisocial and criminal behavior. Equally, future studies must not only consider these shortcomings, but also explore the many existing strategies and solutions in place that are assisting students to remain in schools.

References


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Experiences of Becoming and Being Academic Women in Bhutan

TW MAXWELL, DEKI C. GYAMTSO, KINLAY SEDEN, NEYZANG WANGMO, DAWA LHAMO, SANGAY TSHECHU, TSHERING CHODEN, UGYEN TSHOMO, AND NAMGAY LHAMO

This article focusses on the experiences of academic women in becoming and on being academics. Although there is a strong legal environment for gender equality in Bhutan generally, in practice there are socio-cultural interpretations of Buddhist teachings that have negatively impacted upon women. No research has previously been carried out on women in Bhutan becoming and being academics. In this exploratory study, 15 senior and 15 junior women academics were interviewed. Eight research assistants (RAs) interviewed two junior and two senior female academics each in English. Each RA transcribed the data which were analyzed with the assistance of NVivo. The major inspiration for the younger women to become academics was their teachers. Parents, family and partners were also seen as important support for junior and senior informants. Social structures and practices, supported by certain Buddhist interpretations, were dominant in affecting these academic women’s role in the university. Teaching load was apparently shared equally but research and service roles were strongly gendered. Discriminatory practices were identified including unequal access to learning opportunities (including overseas), in research and in access to power (information). Two thirds of the interviewed women had practical suggestions about how to improve gender equity. The vast majority of the 30 women interviewed indicated that they were happy with their work as academics but not happy with prevailing policies and practices related to women and their academic life. Formal leadership was dominated by men. Policy, practice and research implications are identified.

Keywords: gender; female academics; university women; Bhutan; influences; support

Introduction

There have been a multitude of studies of academic women in the West and some in developing countries (Maxwell et al. 2014) but very few in South Asia. There are no studies of academic women in Bhutan. In this exploratory study, the second in a series of six, we delve into past and present influences upon academic women. After addressing the gender literature of Bhutan we then briefly set out the methodology followed by the results and a brief discussion and conclusions.

Bhutan is a small, landlocked country bordered by China (Tibet) in the mountainous north and in the south by the north-east plains of India. It has just three quarters of a million people. Beginning about the 1950s, Bhutan slowly moved from a medieval state and is now a democratic constitutional monarchy (since 2008). The Fourth King is credited with identifying gross national happiness (GNH) as an important governmental decision-making criterion as a bridge between material development and the “fundamental values of kindness, equality and humanity” (Wangchuk 2009, p. 6). The most recent GNH analysis in Bhutan indicates that men are happier than women. 49% of men are happy, while only one third of women are happy, a result which is both striking and statistically significant. Women do better in living standards and ecology. Men do better in education, community vitality and psychological wellbeing. Men and women are about the same in health, time use, governance, and culture (Ura, Alkira, Zangmo & Wangdi 2012, p. 58).

Bhutan’s Human Development Index is 0.584, ranked 136 of 172 countries (UNDP 2014). This was just below the average for the region and toward the bottom of the medium human development range. Bhutan’s Gender Inequality Index is 0.495 (102nd of 149 countries) which is about the mean for South Asia (includes Afghanistan).
A brief look at the status of women in Bhutan
Like the majority of South Asian nations, Bhutan is signatory to UN Convention on the Elimination of all forms of Discrimination Against Women (CEDAW). Legislation in Bhutan is non-discriminatory. The constitution of Bhutan guarantees equal rights and opportunities to both women and men. The Local Government Act, 2009, allows both genders to hold office but the minimum education requirement does disadvantage more women than men. The Labour and Employment Act, 2007, legislates for equal pay for work of equal value and female civil servants can have three months maternity leave with full pay. The Penal Code of Bhutan criminalizes various degrees of sexual harassment, rape, and physical and verbal abuse (Helvetas nd, p. 5). Despite these legal requirements, there are clear distinctions between the social roles of men and women in Bhutan.

Generally, Bhutan is regarded as having a high level of gender equality in comparison to countries in South Asia (Helvatas, nd), however there are still differences between men and women particularly in terms of access to education, enterprise development and governance (Wangdi, 2012). Culturally the role of women can also be defined in lesser terms as demonstrated from the popular sayings used very frequently in everyday conversations. Popular Bhutanese sayings and songs, such as demi aumgi cha lu in (the keys of the household are in the hands of the women) which tells something about Bhutanese culture. Similarly, the derogatory saying aamtsu gi jogo thewai laptsa dra (a woman’s plan/and or decision is like a pile of dust) may also indicate the kind of environment for both academic women and Bhutanese women generally (see Andaya 2008)

Social impact
“Men are mostly associated with the public sphere” (Yangden 2009, p. 121). Other commentators agree (e.g., Dayaram & Pick 2012; NCWC 2008; Crins 2004, p. 593). The NCWC/UNW research attributed the “chronically limited engagement of women in public life” to five factors:

Lack of education and training, lack of functional literacy skills, limited involvement and skills of women in decision-making (both at the household and community level), low self-esteem and poor self-image, and the double or triple burden that women bear as housewives, mothers and income generators (NCWC/UNW 2012, p. 16).

They went on to argue that “these findings seem to contradict the popular belief that it is mainly the women’s ‘double or triple burden’ that keeps them away from public spaces” (2012,p. 16). Despite women “closing the gap” (2012, p. 15) and despite “Bhutanese society being largely matriarchal … there are certain beliefs and practices that set women apart (from men)” (2012, p. 25).

Seventy five percent of Bhutanese are Buddhist (Maxwell 2008). Vajrayana Buddhism indicates no differentiation between genders. Despite this, Wangmo and Gill (2011) have argued persuasively that social roles and structures are influenced by Buddhist values. Crins (2004, p. 581) has made a case that pre-Buddhist concepts also influence social practices (see also Choden 1997, p. 253-254). These claims are supported by a National Commission for Women and Children (NCWC) survey of 541 respondents augmented by focus group discussions (FGD) and in-depth interviews. About equal survey numbers (40%
each) agreed/disagreed with the belief about kyerabgu and “75% of the participants during FGD indicated the ‘religious’ saying ‘kyerabgu’ was one of the main bases for gender differential societal status, such as giving preference to men” (NCWC 2008, p. 6; see also Black & Stalker 2006, p. 11). Moreover, in their FGDs, “95% of the female participants in the rural and 70% in the urban areas expressed their desire to be born as a man in the next life” (NCWC 2008, p. 6-7). In some parts of Bhutan, “women’s bodies have been exclusively associated with procreation and impurity commonly referred to as drib. Drib is originally associated with women’s menstrual and reproductive cycle, but to the layman it has become synonymous with being inferior” (2008, p. 7). Drib (sqrib) is a concept found in the whole of the Himalayas and means any kind of dirt/pollution: it is not solely associated with women and therefore not as gender biased as the report would have us understand (Pommaret, pers. comm. 17th August, 2014). Driglamnamzha, thadamtshig and le jundre also shape Bhutanese social interaction. Together these form a “sacred … pairing of duty and obligation between parent and children; teacher and pupil; husband and wife; employee and employer and state and people, thus encompassing all spheres of social interaction” (NCWC 2008, p. 8).

The majority of respondents agreed that society was less forgiving if violations were committed by women (2008, p. 8). This study also found socially expected labour roles in rural areas (inside/outside) though these were more fluid in urban areas (2008, p. 7-8). In some households where the income was low, the men migrate for work and the women do the outside work as well (Black & Stalker 2006, p. 10). Dayaram and Pick, from their interview study of 34 mostly educated Bhutanese women, found that “although women are encouraged to pursue education and a career, they are still expected to carry the household burden” (2012, p. 141). The women reported they “work for the good of their family/children but also are aware of the overall good that they are doing for their country. Their mothering responsibilities and other duties created conflicts for them and they reported not having ‘me time’” (2012, p. 143-4).

It is often claimed that men and women are more equal in Bhutan than in neighbouring countries. As evidence they point out that for sixty percent of rural women, the family system is matrilineal and a woman may become head of the household (Black & Stalker 2006, p. 10). Unlike those in other parts of South Asia, some Bhutanese men commonly share domestic tasks (2006, p. 11). Traditionally, most marriages are matri-local. Black and Stalker (2006, p. 11-12) summarize:

The Bhutanese are proud that they have greater gender equality than other societies in the region; nevertheless they do largely assume that women are inferior to men, and that their work is less significant. ... In the past these attitudes restricted girls’ education. Today, even though many more are in school, girls typically express the view that they are less important than boys and men, and do not expect to reach a similar level of academic achievement, especially in the higher grades.

Gender and education in Bhutan, particularly universities
The general background to education in Bhutan can be found in Maxwell (2008, p. 61-64). Secular education was only generally introduced in the 1950s. Now, universal primary education MDGs for girls and
boys will likely be achieved by 2015 (Black & Stalker 2006, p. 51; RGOB 2005, p. 12) and gender equity is on track except for females’ enrolment in late secondary and tertiary education (RGOB 2005, p. 12). In Bhutan about one third of men and women over 25 have access to at least secondary education. “In Bhutan, literacy rates for women are 60% in urban and 29% in rural areas, against 80% in urban and 57% in rural areas for men” (NCWC/UNW 2012, p. 16). Choeden (2012), in her Masters research on the gender gaps in household expenditure, explained these differences as education being a male domain (2012, p. 54). She noted that boys were given preference in higher secondary education when parents were forced to make the choice. More generally she found “there was a significant gender gap in the allocation of household resources to schooling of children aged 6-16” (in favour of boys) but “if there was a female household head then this raised the chance of a girl attending school by 5%” (2012, p. 66). She also found “increased household wealth increased the likelihood of girls going to school” (2012, p. 70). Explanations vary. Black and Stalker (2006, p. 51) noted that some parents want secondary aged girls to help at home. The girls’ feelings of inferiority and lack of confidence, previously mentioned, may also come into play. In 2008, just 39 percent of teachers in primary and secondary schools were women (GNHC/NCWC/RGOB 2008, p. 60) with lowest proportions being in remote primary and higher secondary schools which meant lack of female role models. Finally, and most telling, the girls under perform in national external examinations upon which promotion and scholarships are largely determined (2008, p. 54). It would be interesting to know why girls do not perform as well as boys in external examinations although some of the potential reasons can be found here.

These gender differences are evident in other education statistics. Despite higher girls’ primary school participation and survival rates (GNHC/NCWC/RGOB 2008, p. 54) senior secondary girls’ enrolments make up 51 per cent of Classes XI and XII in private schools (requiring lower pass rates) compared to just 39.6 percent in government schools (2008, p. 54). Girls constitute only one third of students studying at university colleges with the majority going into teaching and nursing. Only 20 per cent of overseas scholarship holders were female (2008, p. 56-58). Given these statistics, it is not surprising the number of female academics is very low and even less than the proportion of female university students (Table 1).

### Table 1: Staff in ten colleges by gender and origin, 2011-2013 (RUB 2012, 2013, 2014a)

<table>
<thead>
<tr>
<th>Year</th>
<th>Bhutanese</th>
<th>Expatriate</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male n (%)</td>
<td>Female n (%)</td>
<td>Male n (%)</td>
</tr>
<tr>
<td>2011</td>
<td>300 (75.4)</td>
<td>98 (24.6)</td>
<td>72 (83.7)</td>
</tr>
<tr>
<td>2012</td>
<td>310 (78.3)</td>
<td>86 (21.7)</td>
<td>79 (84.0)</td>
</tr>
<tr>
<td>2013</td>
<td>317 (76.0)</td>
<td>100 (24.0)</td>
<td>66 (83.5)</td>
</tr>
<tr>
<td>Total</td>
<td>927 (76.5)</td>
<td>284 (23.5)</td>
<td>217 (83.7)</td>
</tr>
</tbody>
</table>

There are two universities in Bhutan. The Royal University of Bhutan (RUB) came into being by Royal Charter in 2003. It is a federated university with eight colleges/institutes spread across the country. Article 4 of the Charter says: “Admission to any office or appointment in the university, and the admission of students to the university shall be on merit and irrespective of religion, origin, sex, sexual orientation or race” (Wangchuck 2003). The Wheel of Academic Law (RUB 2006), which governs administration and teaching...
and learning at RUB, mentions gender policy once only in terms of equity on committee membership. In the RUB Strategic Plan 2013-2020 (RUB 2014b) “gender” was not mentioned. The University of Medical Sciences of Bhutan (UMSB) was formed in 2012 from two previous RUB entities and renamed the Khesar Gyalpo University of Medical Sciences of Bhutan (KGUMSB) in 2015. Its Conditions of Service (UMSB 2014) identified no discrimination on the basis of gender only in attending patients and amongst students. There appears to be a systematic gender blindness in education in Bhutan. Only in the Government’s 10th Plan was gender featured in education policy documents (GNHC/NCWC/RGOB 2008, p. 52) and, previously, gender-segregated data were hard to find. Similarly, the influential Education Sector Strategy: Realizing Vision 2020 Policy and Strategy (RGOB 2003) did not mention gender. Summarising, at least in education, there appear to be structural as well as socio-culturally-based forms of gender discrimination.

**Explanations of a gendered academic world**

Maxwell et al. (2014) briefly reviewed the extensive literature on Western women in academia and concluded that gender matters, gender being constantly redefined and negotiated (Poggio 2006, in van den Brink & Benschop 2012, p. 72) and culturally determined. Social-cognitive (Valian 2009, p. 198) as well as normalization theory (Maatta & Lyckkage 2011) are potential explanations. Aspects of Giddens’ theory of structuration were used for analyzing the relationship among social structures (e.g. discrepancies between university policies and practices) and their interaction with human agency of junior and senior female academics.

**Method**

The broad methodology of this exploratory study is set out in Maxwell et al. (2014). In this study, each of eight research assistants (RAs) identified and randomly selected two senior and two junior female academics in their college/institute to interview. Two RAs could only identify one senior female academic in their college. Hence there were 28 interviews from six colleges of RUB and two from KGUMSB. Interviews lasted between 30 and 45 minutes each and 29 were carried out in English and one in Dzongkha. Each interview was transcribed following a schedule. Interview data were analyzed with the assistance of NVivo (2012). The two RUB colleges not represented have strong majority male staff and student populations.

In terms of procedures, the senior author originally identified six mostly junior female academics. Two other junior female academics became interested and requested they join the team. All eight attended two meetings in Thimphu where the agenda was very similar to that set out in Maxwell et al. (2014). A small honorarium was paid to each RA. Ethics permission was granted by the University of New England in Australia. A lack of resources did not allow a more extensive study.

**Results**

The interest lies in the comparison between how junior and senior academics signify their roles and the influences and pressures they face(d). The junior academics’ university experience ranged from about one to seven years (average: three years) whereas senior academics’ experience averaged 14 years (range: seven
to 24 years). Many of the informants from the professional colleges had also previously served in their profession as, for example, school teachers or nurses.

**Influences on becoming an academic – shaping their role**

The majority of the younger women (n=10) said they were inspired by their own teachers or simply had the desire to be a teacher/academic. For example, one said: “I kind of always knew that I was going to join a teaching job … somewhere I can teach and learn” and another “growing up as a child I always admired teachers … (because of) their style of teaching and then the way they interacted always inspired me.” A small number (n=3) of both groups thought that teaching went well with women’s caring nature. The senior women did not say what inspired them, but three senior women indicated that teaching was a second choice.

The major shapers of the junior women to become academics were their family and the government. Most mentioned family/parents generally or one family member specifically. A typical comment regarding the former was: “My parents … wanted me to pursue my degree and get a good job as I was the only female child for them. They really had high expectations of me … and helped me in whatever way they could.” Another said that:

> What I am today is all because of [my sister]. During my early childhood, my Mom, who is a farmer, wanted … to take care of the farmland. But my eldest sister, she is a teacher … she saw the capability in me … She had to fight with my Mom to take me to school. … I got the opportunity to do the … Bachelor of Nursing … and even during [rough] times my sister was the sole support for me.

Five of these women specifically mentioned the support of their partner mainly through care of children when they were studying. The government was recognized as influential by six of the 15 junior women mainly through its support for free schooling and for scholarships to go to university and further study. Four of the senior women also recognized the government for its support and like their juniors the majority said their family was the dominant support that was especially necessary in the early days of secular education. In becoming educated, the senior women mentioned family (n=4) and partners (n=5) as important for child care. Six women pointed out that their qualifications and experience were important shapers of their academic role.

**Factors influencing their daily academic life**

Ingrained social-cultural values have largely impacted the daily academic life of the women interviewed. There was acceptance of the idea of promotion by merit. None of the interviewees critically analyzed its existence, say, in the light of the differences in access to research (see below). While the general laws and labour regulations on non-discrimination in Bhutan and RUB are clear, data from one third of the participants in the study pointed out the lack of congruence between policy and practice. For example, one junior informant lamented:
In terms of policy and government intervention it is fine but how it is put into practice, there I see a difference. For example, it is said in the college that [an opportunity for] workshops should be given equally but in reality it does not happen. We are sometimes not even informed about the workshop. Actually we all are interested to empower ourselves by attending workshops, seminars etc. Despite recent developments and opportunities:

> Regarding career, we women are just made to teach while men grab all the other opportunities so as to climb up the ladder and the men’s network comes very prominent when it comes to grabbing opportunities. Any workshop, research or training, men always pull their men friends and that is how men land up [being more involved in] research activities and having attended all the other workshops and trainings. We are never informed of such opportunities and sadly in my case I always come to know at the end when things are done or am always informed the last.

It could be reasonable to surmise that she felt marginalized.

Maintaining balance or integrating work and domestic life was not always easy. Unlike two junior women who did not have children and so could concentrate upon their careers, one junior woman observed: “working both as a parent and as academician is a big challenge. Women … have to do many things at home.” Balance was harder as a single parent (n=1) yet comparatively easier for nurse academics who no longer had evening and night work (n=2) or if childcare was available at home. Guilt invaded some women’s thoughts: “I have to divide my time and I feel I give less time to my children and more to my work.”

The older women were more definite about the impact of their “multiple burden.” Thirteen of the 15 explicitly mentioned the demands of child care and a much lesser number mentioned household chores although having a baby sitter (n=3) and a husband who helped (n=4) made things easier. One woman mentioned it was not in her husband’s culture to assist in the home. Furthermore, remote college locations made baby sitters and use of extended family much more problematic. Four senior women looked forward to being empty nesters so they could concentrate more on their career, particularly research.

Managing time well was an important related issue for six of the senior women. In relation to work/life balance, metaphors used included “sandwiching”, “juggling” and “handling pressure.” Compromises had to be made as the following two quotations indicate.

> I don’t want to fail in my role as a mother, wife and a daughter to my family, either. So I do my best in teaching and perform moderately in other scholarly activities.

> I really want to do lot of research… but the problem is when you [do] you need to move out to collect data and then you [also] need to be at home … I guess that is the main thing that is affecting my career.

Additionally, one of the consequences of finding a balance in work and life is to compromise “time [for myself].” When asked directly, three junior and four senior academic women thought they did not have any (though this did not bother two of them) while two juniors (one who was not married) and two senior women thought they had sufficient.
If we think of work/life integration as an alternative conceptualization, of the 30 interviews two junior and four senior academics indicated that their work and home life were integrated comfortably. One senior woman put it this way: “I have a different time for my family and different time for work. So being a wife and a mother did not hamper ... my career.” Of course, one way to achieve a more integrated work and family life is to have sufficient support. When asked, six of the junior women and four of the senior women indicated that they had support from their husbands. The most complete expression of partner support was:

He … understands the burden of the job. So at certain points when I have heavy duties, he comes home and … I don’t have to worry about cooking dinner and doing the dishes because he makes sure he takes care of it and if he is busy I do the same, so there is an understanding.

Extended family support was also available (four juniors and three seniors). Collegial support was more evident for the junior women (n=3) than the senior women (n=1). There was no mention of mentoring or specific support from other women apart from two networks (see below).

So far we have identified something of the influences and impacts on 30 academic women. How are these explained by the women themselves? Five of the women implied the driglam namzha where respect was part of the culture. Individuals in both groups talked about ingrained socio-cultural values “making women more submissive.” One senior woman said: “I always keep myself behind.” There was a stigma associated with “acting boldly” according to one senior woman while another said: “I think that one of the weaknesses we have … [is] we give first preference to men [at] every opportunity. So I think that ... fault lies within us … our culture dictates to us.”

However, this acceptance of the “way things are” is changing according to some informants. More women have started earning money by working. It is “different for teenagers” and “It is changing and … Bhutan is seeing a lot of women coming to power and playing a role of a man so I feel it is very encouraging, very positive.” But even this language tells its own story. The concept of “women feel they are inferior to men” is an important force in creating socio-cultural differences between many Bhutanese men and women. Thirteen women commented that women were more noticed for their social “errors”, more busy, felt odd speaking in public, less confident, not leaders and were more in a supportive role. These carried over into academic roles albeit in nuanced and subtle ways. The inferiority associated with being a woman is clearly evident.

Gender differences in academic role

To begin with general differences between male and female academics, seven of the nine junior academics who commented on this clearly stated that there were no differences in the world of work. Two indicated there were subtle differences, for example, “actually on the surface it doesn’t look like there is much difference … because we are given equal number of hours of work and equal pay depending on our grade. However … there are differences. It is there. It will always be there.” In comparison, four of the nine senior women who commented on general differences said that there were no differences between women’s and men’s work. Here “work” likely meant teaching load. Two others saw that men were more in leadership positions. Additionally, the interviews also explored specific academic work categories: teaching, research and service.

No gendered difference in teaching load was reported although two disagreed. Several of each group pointed out differences were not due to gender but individual capabilities. One junior and one senior
noted that women were more responsible than the men in their teaching.

Household responsibilities were said to restrict some women’s capacity to do research although three said they were not so restricted. Several made a point similar to this one: “It is not that they [women] are not given the opportunity but they need support and [should] take initiatives.” In three colleges, a men’s network was seen as a critical factor. As one junior academic pointed out: “It could be due to men’s strong networking outside [of] work, for example, the archery group... and we are left out.” Five senior academics also noticed the impact of the men’s network as illustrated by: “The bigger research project with lots of money is always taken by men who have a good network and we are excluded.” The lack of ability to travel by some women, or, the assumption by men of women’s incapacity to travel, also hindered women’s ability to do research or to gain research skills. Consequently, in contrast to the equality of teaching load, there were considerable gendered differences preventing women from doing research and thereby hindering women’s prospects for promotion.

The third area of academics’ work is service. “Service” can be taken to mean work other than teaching and research such as administration and committee work, management and support work for the community and profession. Interestingly, junior women (n=6) thought that there was little or no difference between males and females in service work whereas all senior women who commented on this (n=8) did not agree. Service leadership roles were not shared across the genders. Again it was the extra burden that was used to explain: “In terms of career, men are given leading roles... women with families are not given responsibilities because they have home responsibilities or maybe they think they are not capable.” Alternatively, women were “not interested.” Regarding leadership, another said: “if men subordinates are there, it is usually difficult to make them do what we want if we are the boss. ...because I think Bhutanese men do not like listening to woman bosses.” There are again a complex of factors involved some of which are summarized here.

However, when it comes to administration, it is normally men who come forward, as is visible in all the colleges ... The cause of this distinction is not too clear. I suppose it is because men in Bhutan are more ambitious than women. Women too like to take up the challenge but are obstructed by some invisible forces such as multitasking work burden, lack of confidence and lack of encouragement from [work mates] to name a few.

In the one college where females have always been in the majority there has never been a female Director. Discrimination Six of the junior and ten of the senior women thought that they were treated no differently from men. The merit promotion system was seen as fair by almost all who commented on this issue though none critically analyzed its existence, say, in the light of the differences in access to research. The idea of equal opportunity was common though opportunities are not taken up as easily by women as we have seen. Looking at this another way, there were more junior women who thought there was some discrimination in the work place. For example, four junior, and one senior, women noted that males were selected more regularly than females for (overseas) workshops because “men colleagues are free and more mobile. I could not accept workshops and training [opportunities] outside the college for two years because I had to be with
my son. It is only now … I can attend workshops and training away from the college.” Another four junior and a similar number of seniors observed that women were not considered for vacant positions including acting positions. One young woman was subjected to jokes and two to sexual harassment the most extreme example of which was perpetrated by a senior male who made “cheap jokes … and ridiculed them publicly with regard to their appearance and marital status.” Other points of discrimination observed by the women included that responsibilities were given to men, there were male-oriented selection criteria (“emotional security”), women were not appreciated (n=2), rules were applied differently, leaders had male and female favourites and double standards were evident.

The men’s network was mentioned previously and we can go into its effect more fully here. Of the 17 women who commented about this, nine had observed the strength and power of the men’s network. “Sometimes I see a lot of men hanging out in groups … and they do things together… They discuss together, they apply for projects… then they teach each other and then, they have that strong [bond].” However, it was also interesting to note that in two of the colleges a women’s network was present but apparently not nearly as powerful as the three men’s networks. One was a fledgling women’s research group.

Although there was a minority of women who thought that access to power was about the same, including four from the female-dominated college, there were additional ways in which men were seen to have greater access to power including:

- Men were in more powerful positions (n=4);
- Men were on the committees (n=4);
- Men did the talking in meetings (n=3);
- Women may not be heard (in meetings) (n=2); and
- Men were more powerful.

After a longish interaction an interviewer summarized:

So, basically what we are agreeing here is that men are there at the top level [and] they have access to information (Interviewee: Yes!) and they have stronger hold or strong power over information (Yes!) which is not equally disseminated (Yes!) or communicated well to rest of the faculty members (Yes!).

Sometimes information does not generally circulate smoothly. Those who have it do not always want to circulate it and use it to their own ends. When men hold higher positions this indirectly becomes a gender issue (Pommaret, pers. comm. 17th August, 2014). Despite the discrimination and all else that these academic women face, more than three quarters said they were happy except for two junior and three senior women from one college.
Possible future actions

Only one woman thought that the future was “looking good.” Yet five junior and three senior women (out of 15 each) saw no reason for change. Despite this, almost all of the women were able to nominate changes for the better. Seven junior and six senior women had hopes for the future based on a need for greater equity, such as, more women academics (n=6), more senior women (n=4) and women needing to be strong (n=2). Largely based on these ideas, there was a considerable number, and a wide range, of practical suggestions for the future from 21 of the 30 women. Promoting women in research was a recurring theme particularly amongst the seniors, e.g. inclusion and quotas. Eight different women pointed to the need for attitude change either of men, of people, of the government, and “women themselves must change.” Western strategies were less evident: equity in employment (n=1), child care provision (n=1), mentoring (n=1) and the one suggestion of a quota system mentioned above.

Discussion

Although four women mentioned the support of their colleagues as part of their daily academic life there was little mention of mentoring and not one mention of mentoring of junior women by senior women. Several of the junior women were looking for mentor but only one college had a women’s issues group. It is also very interesting to note that even though about half of the women pointed out how important the men’s network was, only two women mentioned forming women’s networks as an important future development. There was little attention given to affirmative action strategies.

Child care may be less of an issue for some Bhutanese academic women. This is best evidenced by just one mention of university-based child care as a future action. It was also interesting to note that there were a number of both junior and senior women who had, and/or did, count on their partner’s support for child care and household duties. Of course the extended family, if close enough, provided support; and child care centres have mushroomed in the urban areas over the last few years. There was seldom mention of the common practice, even for lecturers, to have paid live-in helpers.

There appears to be little involvement by women in leadership positions. The major reasons given were the “double or triple burden they faced.” This contrasts with the finding of other research in Bhutan showing that women’s leadership involvement (in politics) had more to do with low self-esteem and poor self-image (NCWC/UNW 2012, p. 16). More research into this would be worthwhile.

We found gender structural biases, for example, in Bhutanese education documents. To some extent this was evident in the lack of clear policy in at least RUB. The RUB human resources policy does use careful gender language but there is no statement regarding non-discrimination. Some women talked about gender equity - a reasonable assumption given Bhutan’s agreement with important international conventions. However, the reality was a highly gendered university workforce. This is another structural problem.

Perhaps an even more important point is the apparent lack of critical analysis in the discourse of the women we interviewed. This was no more evident in the common observation that, for one reason or another, women academics were not as involved with research. The connection was not made that the university now includes research output amongst its promotion criteria meaning that it will be the men who will be promoted. It is not sufficient that the offer of research opportunities is made to both genders where informal male networking or other gendered mechanisms marginalizes women. Cultural assumptions and
gendered practices deserve critical analysis and discussion. Respectful critical analysis is one of the roles of the university. Over time this could counter the marginalising and normalising evident in these data.

Conclusion
This exploratory research into the roles of, and influences on, academic women in Bhutan is the first of its kind. The major inspiration for the younger women to become academics was their teachers. Parents, family and partners were seen as important pillars of support in becoming an academic for both groups. A minority of senior women indicated their academic results were also important. Most of the 30 women interviewed indicated that they were happy with their work as academics but on this and some other issues there were differences between colleges.

Academic life had changed radically in the last decade but socio-cultural structures were still dominant in affecting these academic women’s role in the work force. While teaching load was apparently shared equally amongst women and men, research was strongly male dominated most notably because of the importance of the men’s network or assumptions about women’s capacity or availability. If this continues then many women will not gain promotion. Leadership roles are dominated by men. Additionally, discriminatory practices were identified including unequal access to learning opportunities (including overseas), in research and in access to power (information). Two thirds of the interviewed women had practical suggestions about how to improve gender equity in their university (and beyond).

Policy and practice changes are needed. Structural inequities need to be addressed. Critical analyses are needed of gendered and ungendered places and practices and the reasons for these. New ways need to be found for women to participate in research and this appears to be a role for the Institute of GNH Studies (RUB 2014b, p. 31). In the light of the present data, RUB might generate specific policies to facilitate the development of women academics.

Notes:

1. Kyerabgu is an Himalayan cultural belief that it takes nine rebirths for a woman to become a man and therefore be given a chance to attain Buddhahood.
2. Driglam namzha is the code of behaviour or discipline, thadamshig is the code of loyalty and le jundre is the karmic action of cause and effect.
3. Previously the colleges were teaching institutions providing workforce to Ministries to which they were linked.
4. Probably southern Bhutanese/Nepali extraction.

Acknowledgement
Our thanks to Dr Francoise Pommaret for helpful comments.

References


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A Tracer Study on the First Batch of B.Ed (four year programme) Graduates of Samtse College of Education

SONAM WANGMO, BIJOY HANGMO SUBBA, TANDIN PENJOR, KARMA JURME AND YANGDON

This tracer study explores the effectiveness of B.Ed four year Programme in preparing competent, confident and committed teachers who can teach any classes (PP-VI) in the Primary School. A total of seventy one samples were studied which comprised of first batch of B.Ed four year graduates, senior teachers and principals. The survey was conducted through online using Google form. The significant findings of this study comprise: B. Ed primary four year graduates from Samtse College of Education (SCE) are competent in teaching classes PP through Six although most of them are more competent in teaching upper primary; and the B. Ed primary four year programme helped build graduates’ confidence and competence in teaching different subjects in terms of content, methodology, life skills, professional and personal skills. The study also reveals that more modules are required in science and language subject. The key recommendations therefore are: The B. Ed Primary Programme needs to emphasize on equal number of modules that would build graduates’ confidence and competence in teaching both lower and upper primary; and college should explore ways to support graduates either by providing refresher courses, reference materials or opportunities to attend workshops and seminars.

Key words: Tracer Study, B. Ed Primary (Three Year Programme), B. Ed Primary (Four Year Programme), Confidence, competence

Background

B.Ed Primary three year programmes with elective subject (English, Geography, History, Physics, Math, Biology or Chemistry) was launched in 1993 in order to prepare and create a group of people with higher qualification (class XII leavers) to provide the much needed academic and professional leadership at the primary level (SCE, 2009). Therefore, Primary Teacher Certificate (PTC), a two-year teacher-training course offered for class X leavers was discontinued in 2000.

However, there was a general perception of poor standard of learning in the early years of primary school and graduates preferring to teach at higher level because of their subject of specialization. Thus B.Ed Primary four year programme was launched to replace B. Ed Primary three year programme, which was a blend of the B. Ed Secondary programme and Primary Teacher Certificate.

The emphasis on the B.Ed Primary four year programme was to: offer ‘qualified and competent’ primary school teachers; provide a balance between theory & practice and pedagogy & content. The programme offers 40 modules spread over four years. The first two years aim to equip student teachers with skills and techniques to handle teaching and learning in the lower primary classes. The third and fourth year provide knowledge, skills and techniques required to teach in the upper primary classes.

The programme has trained so far a total of 122 pre-service (36 in first batch, 42 in second batch and 44 in third batch) and 103 in-service (71 in first batch and 32 in second batch) primary teachers.

Literature review

Bolaane, B., Chuma, J. M., Toteng, B., & Molwane, O. B. (2010, p.7) define tracer study as “survey of graduates from institution of higher education and are often seen as an important tool of institutional de-
velopment especially when the world of work is changing rapidly”. It puts forward certain basic types of information pertaining to course offered in the college and the graduates’ competency in the field. Findings of such studies can often depict the relevancy of course offered and field reality. It is also referred to as “a graduate or alumni survey since its target group is former students” (Millington, 2006). The information acquired by means of tracer study can also indicate possible shortfalls in a programme and serve as a basis for review of programme, such that programmes might be brought close to the needs of the field.

For the purpose of our study, the ideal target was the first batch of 36 teacher graduates of 2012 to achieve effective tracer feedback from the field. The previous study conducted by National Institute of Education (NIE), Paro in 2001 indicated that the performance and enthusiasm of the teachers was high in the initial years but gradually dwindle and roles and responsibilities they shoulder were minimal (Wangchuk, 2002). Wangchuk, (2002) carried out similar tracer study for first B.Ed graduate of National Institute of Education (NIE), Paro. In this study, he explored the match between the needs of the schools and programme objectives at the NIEs in the teacher training, problem faced by the initial teacher graduate in the schools and to make a strong link between the pre-service teacher-training programme and the field reality.

His study revealed that: Majority, 30% of 34 graduates teach in upper primary classes despite being trained to teach lower primary; 60% of graduate are weak in teaching poetry and grammar; many graduates were reluctant to teach Environmental Studies and science; and almost all the graduate faced problems in the initial years but majority of them overcame with the professional support from the principals and senior teachers.

In addition to the areas covered above, this study further explore the perception of the principals and senior teachers on the training provided, competency, and performance of B.Ed four year programme graduates.

The information from this study is expected to provide systematic feedback which will be helpful to address the shortcomings in the training and the curriculum during the review of programme as demanded by the Wheel of Academic Law.

**Objectives**

The overall objective of the tracer study aims to obtain a better understanding of the teacher graduates performance in the schools, how they apply theory and pedagogy in practice. Additionally the study also intended to survey the quality of training offered by the college and to assess the study conditions they experienced. This information may then be used to review the curriculum of B.Ed Primary four year programme for better quality assurance. Thus the study will explore the following:

1. Evaluate the effectiveness and relevance of B. Ed Primary (Four Year) Programme in preparation of primary teacher.
2. Find out competence of B.Ed Primary three and four year graduates.
3. Trace the strength and limitations of the programmes.
4. Relate the basis of the experience and views of graduates to review the modules of the programme.
5. Make strong link between pre-service teacher programme and the field reality (Wangchuk, 2003).
This tracer study is designed to provide relevant information, both quantitative and qualitative, to Curriculum Developers and Programme Managers in helping them make informed decisions and fine-tune the programme, in view of producing competent and confident primary teachers.

Method
The respondents for survey include 42 graduates (15 male and 27 female), 8 senior teachers and 21 principals from different parts of the country. The first batch of teacher graduates was chosen because by then they had one year of teaching experience in the school. The respondent also includes principal and senior teachers of selected from the same schools where the graduates were teaching to collect relevant and authentic information on the performance, competency and quality of the graduates.

The question was developed based on the research objectives intention proposed above. Three sets of questions were developed for different category of respondents. The questionnaire for teacher graduates was designed to collect the data on various variables viz competency and confidence to teach in primary classes PP through VI (Wangchuk, 2003), relevancy of the programme offered by the college (Zainab, Edzan, & Rahman, 2004; Wangchuk, 2003), difficulties faced by the graduate in field (Wangchuk, 2003), the schools where the graduates are placed, get feedback for improvement of the programme (Zembere & Chinyama, 2008) and the professional support they expect from the college.

The questionnaire prepared for Principal and senior teacher is focused on gathering the information on the competency and quality of the teacher graduates, professional support rendered to the graduates, and to compare the performance of B.Ed three year and B.Ed four year graduates in the school.

The survey questionnaire comprised of closed type of questions at large and a few open-ended questions which generated qualitative data. The pretesting of the survey was done by employing few lecturers. The lecturers expressed the questionnaire was fairly clear and straightforward and captured all the information required to meet the objectives of the study. The pre-test also ensured that the connections between the linked questions are made correctly.

The survey was launched on 9th December, 2013 and was closed by 15th February, 2014. Participants were requested to fill up the survey questionnaire on-line by clicking the hyperlink sent to them through e-mail.

Data Analysis
The initial analysis of quantitative data generated by Google form was used. Further, MS excel was also used to filter the data and generate graphs. The open ended questions in the questionnaire were analysed looking for the themes that address the objectives of the study. The data triangulation was done by analysing the open-ended question prepared for the graduates, senior teachers and principals.
Results and Discussions

Graduates

Subjects currently teaching
At the time of the survey, 54% of the graduates taught classes PP - III and 46 % taught classes IV – VI: 27 % taught English, 25% taught Mathematics, 12 % taught Dzongkha (PP - III), 15 % taught Thakor Lobjong (Environmental Studies), 8% taught Science, 10 % taught Social Studies and 3 % taught other subjects.

This finding reveals that increased in the duration of training and removal of the elective subjects have helped the graduates to focus on teaching primary classes. It also found that majority of the B.Ed primary four year graduates (92%) are reluctant to teach science which is evident in the study by Wangchuk (2003) for B.Ed primary three year graduates. The reason of the preference of teaching subject among the graduates can be areas for future study.

Confidence and competent in teaching all the subjects in primary classes
Out of 42 graduates, 67% maintained that they felt confident to teach all the subjects in primary classes; 5% expressed incompetency in teaching all the subjects in the primary class; and 28% did not respond.

This is because the modules offered by the college helped build their competence in terms of the different aspects: content (21%), methodology (33 %), life skills (15%) and professional and personal skills (31 %).

Problem(s) in the initial stage of teaching
A few graduates (19%) encountered problems in the initial stage of teaching owing to lack of experience, confidence and refined content knowledge of the subject(s). Added to this were the problems of poor classroom management skills, inability to apply a variety of skills and strategies, unavailability of teaching learning materials, being overwhelmed by curriculum, syllabus, content, assessment and taking time to get accustomed to the whole school system. It is not a major concern as similar problems were faced by the beginning teachers in the study conducted by Veenman (1984).

However, they resorted to different means and measures to overcome these problems and challenges: such as seeking help from senior and experienced teachers; improvising teaching learning materials; attending different workshops and in-service programmes; and observing the lessons of experienced teachers and learning from them. Besides, they also invested a lot of time, energy, and innovation in planning the lesson well and that took care of most of the challenges and the problems.

Usefulness of the module taken at SCE
When asked about their views on the usefulness of the module to them and the students, it is encouraging to discover that 55% of the graduate (Figure 1) found the modules useful to themselves and the students. However, they have found the module “Knowing, Learning and Teaching” is not relevant as it is too philosophical and cannot be applied in the reality.
Inclusion of more subject content in the syllabus

The graduates (31% of 42) indicated their satisfaction with the number and type of modules prescribed for the B.Ed four primary programme. On the other hand, 24% said that the syllabus must provide opportunity to familiarize with the different subjects taught in the schools through hand-on experiences. The graduates felt the need to have more in-depth knowledge in Mathematics in order to teach and help children learn Mathematics better. In addition, subjects like Science, Social Studies, Agriculture, and Library should also be included in the programme to build a strong foundation for these subjects.

Professional help rendered by the school

The graduates receive professional support from the management and administration in the form of access to library and reference books (43%), help from senior teachers (40%), through SBIPs (48%) and access to ICT facilities (33%) and others (2%).

Out of these professional support networks existing in the schools, most of the graduates said that the SBIP is one of the most effective one (Wangchuk, 2003). It is a forum for them to co-create knowledge with their colleagues, share ideas and learn from one another, be introduced to new skills and strategies and be more conversant about the different assessment tools.

Nevertheless, 52% of the graduates express that they would like SCE to provide them professional support like refresher course in content and methodology either in the beginning of the year or during the winter breaks in the form of seminars and workshops. In addition, they also wanted the college to provide teaching/learning reference materials. This is the area that the college must explore to keep abreast with the curriculum, pedagogy and know the realities in the field.
Change to make in the modules offered
When respondents were asked whether there is need to make changes in the module offered, 19% of the graduates claimed that the modules offered in the college need to be changed. They suggested that the curriculum must include more Science and Social Studies modules, provide workshops on action research and orient the teacher to the latest teaching skills and methodologies. The module like Foundation of Early Childhood Education needs to be in Bhutanese context as it is strewn with western concepts.

Further, they expressed that the module ‘Knowing, learning and teaching’ could be replaced by some modules which could help graduates build their competency in language, to inculcate and build positive attitude towards teaching profession.

Principals and senior teacher

Competency of B Ed Primary four year graduates in teaching classes PP to VI
All the Principals and senior teachers contented that the training provided by SCE is adequate in producing competent teacher graduates. The principals expressed that, 76% of graduate are competent in teaching upper primary and 24% in teaching in lower primary. Contrary to perception of the principals, the senior teachers noted that the percentage of graduates competent in teaching upper primary and lower primary is 50% each.

However, as per the finding from responses of the graduates, most of them (54%) teach in lower a primary class which is substantiated by the senior teachers. Thus, it can be concluded that the majority of graduates possess the required skills, knowledge and competence to teach classes PP through VI.

Professional support rendered by principals and senior teacher
While in the field, the graduates receive a wide range of professional support from the principals and senior teaches such as given in Table 1.

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<th>Table 1: Professional supports provided by Principals</th>
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<td>Professional supports provided</td>
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<td>Access to library and reference books</td>
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<td>Provide access to internet</td>
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<td>By conducting staff development programmes</td>
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<tr>
<td>By directing to attend workshops/seminars</td>
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<tr>
<td>By updating their knowledge through further studies</td>
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<tr>
<td>Directing to senior teachers</td>
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<td>Peer tutoring</td>
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Out of these, staff development programmes (SDPs) constitute 76 % of the total support received by the graduates and is therefore the highest form of support. It is heartening to find that the principals and senior teachers are concerned about providing a quality education to the students. These effective mentoring practices could be also practiced by other schools which are not covered by the survey.

Nevertheless, principals feel that SCE is still looked upon as an important and an unflinching
source of professional support to help the graduates boost their professional calibre. The support could be in the form of: providing teaching learning materials, reference materials and refresher course. The same could be delivered through workshops and seminars (67%), online discussion forum (57%), correspondence and lecturer visiting school during teaching practice (38%), and individual teachers visiting college and seeking help (17%).

Performance of B.Ed primary three and four year programme
When asked to give opinion on the performance of B.Ed primary three and four year programme, 71% of the principals and 88% of the senior teachers have the same opinion that the four year graduates perform better than the three year graduates.

They believed that the four year graduate have received an additional year of in-depth training in content and teaching methodologies, had the opportunity to enhance their confidence, expand their experiences and be thorough with all the primary school curriculum. Thus, they are competent and consequently are willing to teach all the subjects in the primary classes.

Conversely, the principals and the senior teachers also felt that the three year B.Ed programme graduates were deprived of one year of training in content, skills and strategies. In addition, their focus and attention had to be divided between the secondary elective subject and the primary modules that they had to take and this is also reflected in B.Ed primary syllabus handbook (SCE, 2009, p3). As a result, they are not as competent as the four year programme graduates and are reluctant to teach all the primary subjects.

Suggestions by principals and senior teachers for the improvement of B.Ed Primary four year programme
Although, the Principals and senior teachers are contented that college has done a commendable job in producing competent primary teacher graduates, they expressed that there is still room for grooming better graduates, which could be achieved through vigorous training in relevant skills and strategies.

Some of the suggestions made by principal’s were: provide vigorous training in skills and strategies; provide opportunity to teach in primary classes; align the B.Ed Primary programme with the primary school curriculum; and admit student in the programme who has right attitude towards the profession.

The senior teachers suggested that the programme should include: module in sound and speech; extend the duration for teaching practice, add more Science module and reduce Dzongkha module.

Conclusion
Based on the findings from this study, it is found that the modules offered by SCE are adequate in producing competent and confident teachers. At the same time it also indicates that there is a need for SCE to include more Science modules and reduce Dzongkha module. Further, study confirms that graduates are competent in teaching Class PP through VI although principals claim that most of them are more competent in teaching
upper primary despite the fact that most of the graduates have stated that they teach lower primary.
It is also evident from the findings that the B.Ed four year programme graduates from SCE perform better
than the B.Ed three year programme graduates. The finding resonates one of the aims of the B.Ed Primary
four year programme: all graduates from this programme will be able to teach any classes and any subject
in the Primary school (SCE, 2009, p3).
The graduates receive many forms and types of professional support from the senior teachers and the Principals. However, the back-up support from the parent institute is still looked upon: from providing teaching-learning and reference materials to providing refresher courses in content and methodology.
Respondents identified that module ‘Knowing, learning and teaching’ is too philosophical to comprehend and put into practice in every day teaching and learning. It has been suggested that it be replaced with a module that will help build graduates’ competency in language by helping graduates to develop and nurture their skills in teaching sound and speech.
The study shows that while the B.Ed Primary four year programme has certain strengths, it also identifies certain areas where improvement could be made to ensure that graduates have the skills and knowledge they need in the reality.

Recommendations
Based on the findings of this tracer study, the following recommendations are made:
The B.Ed Primary Programme needs to emphasize on equal number of modules, particularly in Science and Dzongkha that would build a graduate’s confidence and competence in teaching both lower and upper primary. This recommendation needs to be considered during the programme review.
The SCE should explore ways of supporting the graduates either by providing refresher course, access to reference materials or opportunities to attend workshops and seminars.
For this college can conduct need assessment and look for the ways to support the graduates in consultation with Ministry of Education.
The B.Ed Primary Programme needs to include a module to build a graduate’s competency in teaching sound and speech. This recommendation may be considered during Programme review.
The B.Ed Primary Programme needs to review admission procedures to admit candidates with right attitude towards the profession.

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Engine of FDI in South Asia: Lessons for Bhutan

SANJEEV MEHTA

Low and declining share of South Asia in Global FDI inflows is a major development challenge for the resource constrained economies. This paper examines the drivers of FDI to South Asia using a log linear panel regression model. The model establishes that market size and infrastructure positively influence the FDI, while, labour productivity is found to have negative effect on FDI in South Asia. These findings also provide explanations to declining share of South Asia in global FDI in the context of increasing role of vertical FDI. Paper also examines what lessons Bhutan has to learn to promote FDI.

Key Words: FDI, market access, infrastructure, labour productivity and global value chain

Introduction

Foreign Direct Investment (FDI) is a costless way to mobilize external resources for development. A preponderant literature such as (Barro & Sala-i-Martin, 1999), (OECD, 2002) and (Kathuria, 2000) shows that FDI contributes to productivity growth, technological upgradation and its diffusion, export promotion and enterprise development in the host country. However, some country specific results and cross sectional studies, such as, (Nunnenkamp, 2002) and (Vijayakumar, Perumal, & Rao, 2010) also indicate towards adverse welfare impact of FDI. There are two major areas of focus on current research on FDI- one aims to identify the drivers of FDI and the second relates to understanding the channels of welfare enhancing impact of FDI in the host countries. This paper aims to identify the drivers of inwards FDI to South Asian countries. Although, a larger number of studies have focused on identifying the drivers of FDI to South Asia than channels of its welfare impact, there are still some knowledge gaps and scope for improvement in terms of its regional coverage and methodology. This study differs from other studies broadly in two ways- one, expanding the coverage by including Bhutan and Afghanistan in the study. No former study has included these two countries in their efforts to identify drivers of FDI in South Asia. Second, this assumes that there is log linear relationship in how the FDI responses to changes in explanatory variables.

Despite limited clarity on what drives FDI and what are the channels of its welfare impact, there is greater acknowledgment among the developing countries that net benefits of FDI are positive. It is because of this changing perception in the last three decades, coinciding with market reforms across the globe, FDI has increased sharply from US$ 57 billion in 1980 to US$ 1.35 trillion in 2013 (UNCTAD 2013). Sharp growth in the FDI was reversed by the financial crisis of 2008 and after a steeper decline till 2009, the FDI inflows are slowly rebounding, although they still remain below the peak level of US$ 2 trillion attained in 2007 (UNCTAD, 2013). New millennium has also witnessed a discontinuous shift in the global allocation of FDI. Direction of the global FDI is undergoing a rapid shift reflecting greater opportunities for profitable investment in the developing countries. Share of developed countries in FDI declined sharply from 66 percent in 2007 to 41.5 percent and correspondingly the share of developing countries has increased from 29 percent to 52 percent (UNCTAD 2013). Similar trends are also observed within the developing countries- the share of small and vulnerable economies have increased and the share of erstwhile larger recipients is declining (UNCTAD 2013). Trends reflect that shares of Asia, Africa, BRICS and transitional economies in global FDI are increasing.
Disproportionately lower and near stagnant share of South Asia in global FDI inflows remains a critical challenge for the rapid growth of the region. Given the large current account deficit and saving-investment gap faced by South Asia, the challenge to attract FDI has become even more critical. Inherent advantages that South Asia enjoys in terms of cheap labour, vast market and rapidly growing GDP are not being translated into greater FDI inflows. More specifically, attracting FDI is a critical question to Bhutan, which is currently faced with three major and interrelated problems- limited base of economic activities, growing youth unemployment and widening current account deficit especially with India.

This paper is divided into three sections- section 2 examines the current trends and emerging issues in the FDI inflows into South Asia, section 3 reviews the relevant literature, section 4 uses panel data from Eight South Asian countries for a period of 2007-2013, to identify the primary drivers of the FDI inflows and section 5 explores the specific issues related to FDI inflows into Bhutan.

**Trends of FDI in South Asia**

In 2013, South Asia accounted for 24% of the global population, about 6.7% of global GDP (World Bank 2013) and only 2.4% share in global FDI (UNCTAD 2013). Not only, South Asia lags far behind in global inflow of FDI, but also, its share in global FDI inflows is also down from its peak level 3.5 percent in 2008 to 2.5% in 2012. India’s predominance in South Asia is rising as it receives about 90% of FDI to South Asia and is distantly followed by Bangladesh which has outpaced Pakistan to the second position in South Asia. Bhutan share in FDI inflows to South Asia has remained close to 0.04% despite 60% growth in its FDI inflows in 2012. In fact only three smallest recipient of FDI in South Asia- Bhutan, Afghanistan and Maldives registered a positive growth in FDI inflows in 2012. FDI inflows to Pakistan declined by 36% India by 29% Sri Lanka by 20% and Bangladesh by 12%. South Asia also experienced sharp decline in the rate of return on the FDI from 14.2% in 2007 to 8.8% in 2012 (UNCTAD 2013).

Bangladesh, India, Pakistan and Sri Lanka have been able to push up the exports of readymade garments by linking them to the global value chains. South Asia has also experience an increase in the share of Greenfield FDI in the service sector activities, mainly, in two sub sectors- electricity, gas and water supply and transport storage and communication. Correspondingly, the share of cross boarder merger and acquisition (M&A) has declined. South Asia has relatively weak manufacturing sector and consequently is not able to reap the opportunities offered by global value chains, which is now emerging as major driver of FDI.
Table 1: FDI Inflows to South Asian Countries (in US$ million)

<table>
<thead>
<tr>
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<th></th>
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<th></th>
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<td>Afghanistan</td>
<td>189</td>
<td>94</td>
<td>76</td>
<td>211</td>
<td>83</td>
<td>94</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>666</td>
<td>1086</td>
<td>700</td>
<td>913</td>
<td>1136</td>
<td>990</td>
</tr>
<tr>
<td>Bhutan</td>
<td>3</td>
<td>7</td>
<td>18</td>
<td>26</td>
<td>10</td>
<td>16</td>
</tr>
<tr>
<td>India</td>
<td>25350</td>
<td>47139</td>
<td>35657</td>
<td>21125</td>
<td>36190</td>
<td>25534</td>
</tr>
<tr>
<td>Maldives</td>
<td>132</td>
<td>181</td>
<td>158</td>
<td>216</td>
<td>256</td>
<td>284</td>
</tr>
<tr>
<td>Nepal</td>
<td>6</td>
<td>1</td>
<td>39</td>
<td>87</td>
<td>95</td>
<td>92</td>
</tr>
<tr>
<td>Pakistan</td>
<td>6</td>
<td>1</td>
<td>39</td>
<td>87</td>
<td>95</td>
<td>92</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>603</td>
<td>752</td>
<td>404</td>
<td>478</td>
<td>981</td>
<td>776</td>
</tr>
</tbody>
</table>

Source: UNCTAD 2013

Literature Review

Primarily, decision to locate the FDI is made by comparing expected rate of return adjusted for risk factors. Expected rate of return on investment in a country is determined by market size, geographical factors, economic policy framework, physical and social infrastructure and institutional framework. The geographical factors, such as location and natural resource base are exogenous in nature as they cannot be influenced by policy framework. A large pool of existing literature including Dunning’s (Dunning, 2001) famous OLI model, (Moosa, 2002), (UNCTAD, 2002), (IMF, 2003), (Mehta, 2007), (Sahoo, Natraj, & Dash, 2014), helps to identify key drivers- macroeconomic condition, size of market, level of human capital, linkages with the global supply chain and quality of infrastructure. Despite existing empirical evidence, there exists high degree of uncertainty on the importance of each factor in determining the FDI. Growth hypothesis of (Lim, 1983) suggest that a rapidly growing economy, irrespective of the size of its GDP, raises the expected profitability of investment and therefore attracts FDI. Many other researchers (Culem, 1988), (Tsai, 1994), and (Charkrabarti, 2001) provide support for this hypothesis. Mehta (2007) analyses the drivers of FDI to South Asia by using cross sectional data from South Asian countries excluding Afghanistan and Bhutan using global competitive index. These studies do not have uniform findings; some find growth rate a better predictor than the GDP itself.

In the rapidly changing global order, the primary drivers of FDI are constantly shifting. Declining trade barriers across the globe have two major impact on FDI- one, horizontal FDI is declining as cheaper trade tend to replace the FDI. Second- rise in the vertical FDI as the TNCs now look to offshore their activities by using Global Value Chains (GVCs). Such FDI also tend to promote industrialization in the host countries. New evidence (World Investment Report, 2013) suggests that GVCs are gaining primary importance in attracting the FDI.
Identifying Primary Drivers of FDI to South Asia

Analytical framework

There are two broad categories of drivers of FDI – one is endogenous to the host economies and the other is exogenous to the host economies. The later one is determined by the nature and choices of the multinational corporations (MNCs). Since the endogenous variables can be influenced by policy framework and other intervention measures taken by the host countries, this study focuses on identifying the drivers of FDI from among the endogenous variables. Selection of explanatory variables for this study was also conditioned by availability of comparable data in all the countries for the given period of time.

This study is based on the assumption that there is log linear relationship between FDI and explanatory variable. The functional relationship can be seen as how responsive is the FDI is with respect to a given explanatory variable. I examined the suitable functional form for the study by comparing two plots- one with unlogged dependent variable against explanatory variables and another with log value of dependent variable against explanatory variables. The later plot appears more linear. This justifies the use of linear log (semi log) regression model for the panel data. For this study, panel data is used consisting of 8 group variables representing South Asian Countries (Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka) for seven years (2007-2012) on 8 predictors. Dependent variable is taken as log value of FDI (InFDI). Given that problem of serial correlation is not significant for micro panel data, it is safe to assume that problem of serial correlation does not exist. Regression equation for the panel model is expressed as:

$$\text{InFDI}_{it} = \beta_1 + \beta_2 \text{InGDP}_{it} + \beta_3 \text{GGDP}_{it} + \beta_4 \text{Infra}_{it} + \beta_5 \text{Lprod}_{it} + \beta_6 \text{Pvtcrt}_{it} + \beta_7 \text{TOI}_{it} + \beta_8 \text{HDI}_{it} + \beta_9 \text{Debt}_{it} + \epsilon_{it}$$

Based on review of the above and other works, following variables are selected for this paper to be used as predictors of FDI:

- **Market Size:** Market size is one of the most robust determinants of FDI. Market seeking FDI moves to the countries with large population and higher GDP per capita. Two proxy variables for market size are used for this study: - log value of GDP (InGDP) and growth rate of GDP (GGDP). Existing literature suggest that both GDP and GDP growth rate exert separate influence on FDI. GDP growth rate helps to change the perception of the investors on the potential market size as different from the existing market size. In this paper, it is assumed that there is lack of endogeneity between the two variables and neither is used as an instrumental variable.

- **Infrastructure:** Physical and social infrastructure is an important requirement for FDI. Poor infrastructure can act s both as a barrier as well as a supportive factor. Poor infrastructure can be an obstacle as it reduces the rate of return on investment. It can also be seen as an opportunity for FDI to bridge the existing infrastructural gaps. In this paper fixed broadband subscribers per 100 people is used as a proxy variable for infrastructure (Infra).

- **Labour cost and productivity:** (Chakrabarti, 2001) found labour productivity is a robust determinant of FDI. In this study, GDP as a ratio of labour force is taken a measure of labour productivity (Lprod).
• Institutions: Many studies such as (King & Levine, 1993) have found a link between FDI and financial market. Better institutions tend to reduce the cost and risk of operating businesses. In this study, share of bank credit to the private sector (Pvtcr) is used as a proxy variable to measure the intensity of coverage of financial institutions.

• Liberalization: Studies such as (Billington, 1999) and (Dees, 1998) provide evidence that trade liberalization policies tend to stimulate FDI. In this study, trade openness index is used as a proxy variable for liberalization. Trade openness index (TOI) is defined as the ratio of the sum of exports and imports to GDP.

• Human capital: Level of human capital exerts a strong influence on the FDI inflows. This impact could be positive or negative depending upon the nature of technology used by foreign investors (Lucas, 1990). In this study, Human Development Index (HDI) value is used as a proxy variable for Human Capital.

• Macroeconomic stability: Studies such as (Bloom, The Impact of Uncertainty Schocks, 2009), (Bloom, Bond, & Reenen, 2007) provide evidence that macroeconomic stability is a good predictor of FDI. Macroeconomic instability tends to create uncertainty and drives away the investors. Foreign investors judge the long term risk of the host country through its macroeconomic conditions. In this study, ratio of external debt to GDP (Debt) is used as a proxy for the macroeconomic stability.

Findings

Based on Hausman test results, p=0.1832 (p>0.05) and chi2 (7) = 10.1, we accept the null hypothesis that there is no correlation between individual error and explanatory variable and conclude that Random Effect Model (REM) is correct. REM Generalized Least Square (GLS) log linear regression model is applied in this study on the panel data to identify significant predictors of FDI. The rationale behind random effects model is that, unlike the fixed effects model, the variation across entities is assumed to be random and uncorrelated with the predictor or independent variables included in the model.

Based on Breusch-Pagan lagrange multiplier test statistic (p=0.0001), we reject the null hypothesis that random effect is not appropriate and there is evidence of significant difference across countries (there exist a panel effect). Random effect GLS model is suitable.

Based on the STATA output, panel is strongly balanced. Wald chi square value 66.68 (8 degree of freedom) is significant as P>chi2 =.000 at 95% confidence. It is established that regression model is a good fit. Differences across units are uncorrelated. Market size measured in terms of both the proxy variables InGDP and GGDP is found to be significant predictor of FDI to South Asia. Infrastructure is also found be significant predictors of FDI. Labour productivity (Lprod) is also found to be significant predictor of FDI.

Market size measured in terms of GDP is found to have the highest predictive power over FDI. The regression estimates suggest that FDI is highly elastic with respect to GDP (154%), which is also significantly more than its elasticity with respect to the growth rate GDP (7.9%). It is quite evident that larger GDP is more important than the GDP growth rate when size of GDP is small. This finding is specifically more relevant to Bhutan. Infrastructure is found to be second most important predictor of FDI in South Asia. Elasticity of FDI with respect to infrastructure is 136%. Labour productivity tends to have a small negative impact on FDI as elasticity of FDI with respect to labour productivity is -0.23%. This effect can
be explained by the fact that most FDI also aim to tap cheap labour and rise in labour productivity tends to make labour expensive, although, its impact is very marginal. Human capital, Macroeconomic stability, liberalization and institutions are not found to be significant predictors of FDI.

**Conclusion**

Market size and infrastructure being two significant predictor of FDI in South Asia has important implications. FDI to South Asia remains market seeking in nature and with the gradual removal of trade barriers across South Asian countries, the horizontal FDI will not remain very attractive in the long run. Trade will replace the FDI and share of South Asia in global FDI will be further adversely affected. Second implication is more crucial for smaller countries such as Bhutan and Nepal. These countries simply cannot expect to attract FDI based on their high growth performance unless the size of GDP expands significantly over the period of time. Regression model reflects that these countries should focus more on expanding the infrastructure base to make them more attractive to foreign investment as they help to increase the rate of return on investment by creating positive externalities.

Findings of this study are quite in line with other studies of similar nature and suggest that size of GDP and infrastructure are most critical determinants of FDI but unlike others it reflect their more predominant role in affecting FDI. Unlike other studies, the findings show that degree of trade openness and quality of human capital are not good predictor of FDI.

**Specific lessons for Bhutan**

Given that FDI in South Asia aims to exploit the market (market seeking), the rapidly expanding tourism sector offers highest possibilities for FDI. Expansion of tourism supporting infrastructure will further enhance the scope of FDI in this sector. The FDI policy of Bhutan should focus on further liberalization of FDI policy in tourism related infrastructure sector. This would have a multiplier effect on FDI in Bhutan.

The second lesson does not come from the findings of this study but from the analysis of global trends in FDI- - Bhutan should aim to leverage opportunities emerging from GVCs. Success in the promotion of FDI in Bhutan would crucially depend on the kind of choices made. Bhutan should make careful assessment of participation in GVCs and even Regional Value Chains (RVCs). First step in this direction should be mainstreaming the GVCs and RVCs in its development strategy by shifting focus away from the production of final goods towards the production of intermediate goods. The industrial policy should aim to nurture the capacity of local firms in this direction so that they can partner with MNCs or State Own Enterprises (SOEs) in supplying crucial intermediate goods as an important part of value chains.

**References**


UNCTAD. (2013). World Investment Report. UNCTAD.


http://data.worldbank.org/region/SAS

Appendix

A) Summary Statistics

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
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</tr>
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<tbody>
<tr>
<td></td>
<td>N</td>
<td>mean</td>
<td>sd</td>
<td>min</td>
<td>max</td>
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<td>FDI</td>
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<td>4,233</td>
<td>11,005</td>
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<td>17.05</td>
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<td>6.654</td>
<td>4.246</td>
<td>-3.600</td>
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<td>-----------</td>
<td>---------------</td>
<td>----------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GGDP</td>
<td></td>
<td>0.0765**</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>(0.0306)</td>
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<tr>
<td>Lprod</td>
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<tr>
<td></td>
<td>(0.000134)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Infra</td>
<td>0.861**</td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td>(0.376)</td>
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<tr>
<td>InGDP</td>
<td>0.935***</td>
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<td></td>
<td>(0.196)</td>
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<tr>
<td>HDI</td>
<td>9.640*</td>
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<tr>
<td></td>
<td>(5.494)</td>
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<td>Debt</td>
<td>0.0199*</td>
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<tr>
<td></td>
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<tr>
<td>Constant</td>
<td>-3.283</td>
<td>-9.709***</td>
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<tr>
<td></td>
<td>(4.220)</td>
<td>(2.003)</td>
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</tbody>
</table>

| Observations | 48 | 48 |
| Number of Cntry | 8 | 8 |

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1
C) Hausman test output

Hausman test

<table>
<thead>
<tr>
<th>Coefficients</th>
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</thead>
<tbody>
<tr>
<td>(b)</td>
</tr>
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<td>fix</td>
</tr>
</tbody>
</table>

-----+---------------------------------------------------------------------
Pvtcrt | -.0404588     .0020816       -.0425404        .0193036
GGDP | -.0133586     .0019489       -.0153075               .
Lprod | .0003985     .0000881        .0004866        .0002511
infra | .4277516     .3016094        .7293611        .3538182
InGDP | -.5809393     .8000195       -1.380959        .7185566
HDI | 11.20698     1.076111        10.13087        17.1531
debt | .039848     .0148617        .0249862        .0120729
TOI | .0107936     3.31e-07        .0107933        .0054076

b = consistent under Ho and Ha; obtained from xtregar
B = inconsistent under Ha, efficient under Ho; obtained from xtregar

Test: Ho: difference in coefficients not systematic

\[ \text{chi2}(7) = (b-B)'[(V_b-V_B)^{-1}](b-B) \]
\[ = 10.10 \]
\[ \text{Prob}>\text{chi2} = 0.1832 \]

\( (V_b-V_B \) is not positive definite)

D) Breusch and Pagan Lagrangian multiplier test for random effects

Breusch and Pagan Lagrangian multiplier test for random effects

\[ \text{InFDI}[\text{Cntry},t] = Xb + u[\text{Cntry}] + e[\text{Cntry},t] \]

Estimated results:

<table>
<thead>
<tr>
<th>Var</th>
<th>sd = sqrt(Var)</th>
</tr>
</thead>
</table>

-----+-----------------+

| InFDI | 1.291406 1.136401 |
| e     | .1768544 .4205406 |
| u     | 0 0             |

Test: Var(u) = 0
\[ \text{chi2}(1) = 15.51 \]
\[ \text{Prob} > \text{chi2} = 0.0001 \]

About the author

Professor Sanjeev Mehta has a teaching experience of over eighteen years. Prior to working at Royal Thimphu College, he worked as a lead UNDP consultant to work with MoEA for developing the economic development policy of Bhutan 2010. He is also a part of national team of Bhutan as statistical advisor for a WIPO sponsored study to measure economic contribution of copyright based industries in Bhutan. He also worked as assistant professor at Sherubtse College, Kanglung for about 14 years. Development economics and macro economics are his areas of specialization. He has carried out research on a variety of issues mainly-poverty, inequality, local government and FDI. He has also authored a book on Bhutanese economy.
Production of Biodiesel from jatropha curcas L. Plants found in Mongar and Tashigang Districts, Bhutan

PHURPA DORJI, KUENZANG TSHERING, YEOZER DOLMA, NORBU YANGDON, NAMGAY DORJI AND JAMBAY

The increase in world population has increased the demand for the energy, as a result of which the world petroleum reserves get depleted. Beside the environmental concerns, the prices of fuel have also increased. Bhutan, having no source of fuel, depends fully on the imported fuel which further deflates the economy. As an alternative fuel source, this study attempts to produce bio-diesel from the Jatropha curcas L. seeds. The Jatropha fruits collected were sun dried and decorticated. Using the hand driven expeller, oil was extracted and processed for two-step acid-base catalyzed trans-esterification. Sulphuric acid and Sodium hydroxide were used as catalysts for acid and base esterification respectively. The crude Jatropha oil was reacted in methanol with gentle heating and agitation. The biodiesel layer formed on top of the glycerol after the reaction was isolated using separating funnel and physico-chemical parameters were tested in East Biodiesel Technology (P) Ltd., Kolkata. The yellowish pale colored biodiesel was produced which exhibited similar parameters that were set by the American Society for Testing and Materials (ASTM), European Union (EN 14214) and Eastern Biodiesel Technologies (P) Ltd., India with flash point above 120 °C, pour point 11 °C and kinematic viscosity 5.6 millimeter square per second. Therefore Jatropha seeds found in Tashigang and Mongar Districts may be used as an acceptable and suitable source for biodiesel production in Bhutan.

Keywords: Physico-chemical parameters, Jatropha curcas L., Trans-esterification, Biodiesel, Catalyst

Introduction

The depletion of world’s petroleum reserves coupled with increasing environmental concerns has led the mankind to seek for alternative fuel sources for petro-diesel (Kywe & Oo, 2009). Moreover as the consumption and demand for the petroleum-based fuel rises every year due to the change in living style and development, huge quantity of fuel is being imported which has detrimental impact on country’s economy. According to Kuensel (2014) 169,315 Kilo liters of fuel were imported in 2014.

An alternative fuel for the petro-diesel can be the production of biodiesel. Consisting of simple alkyl esters of fatty acids, the biodiesel is produced from renewable sources such as inedible oils, animal fats, waste food oil and byproducts of the refining vegetable oils (Berchmans & Hirata, 2008; Rahman & Mashud, 2010). It is ecofriendly and biodegradable (Ma & Hanna, 1999). Analysis of exhaust gas by Rahman & Mashud (2010) showed 1.33 percent of CO₂ from biodiesel as compared to 9 percent from petro-diesel indicating less emission while using biodiesel.

Since the use of food crops has negative tradeoffs for the food security, inedible oils are used for the production of biodiesel. J. curcas L. commonly known as Kharshing (Sharchop) is found to be the most appropriate source of biodiesel (Asoiro, Eng, & Akubuo, 2011; Belew et al., 2010; Kywe & Oo, 2009; Payawan, Damasco, & Piecco, 2010; Rahman & Mashud, 2010; Shivani, Khushbu, & Faldu, 2013). It is fast growing, drought-resistant and hardy shrub of Euphorbiaceae family. It also has the ability to grow on poor soil (Prueksakorn & Gheewala, 2010) and bears fruit after one year of cultivation. The phorbol esters in the seed renders Jatropha fruits toxic for human and animal consumption (Rashid, Anwar, Jamil, & Bhatti, 2010). Hence, production of biodiesel from J. curcas L. seeds has no direct tradeoffs for the food security (Berchmans & Hirata, 2008).

The Jatropha plants are found in the sub-tropical regions where annual rainfall is more than 600
mm and withstands long drought period. It is commonly grown as hedge plant and as live fence.

The methods of biodiesel production depend on the percentage of free fatty acid (FFA) reduction in it. The presence of about 14% FFA in biodiesel produced by base-catalyzed trans-esterification made Jatropha oil inappropriate for industrial biodiesel production (Raja, Smart, & Lee, 2011) and for reducing it below 2%, two-step acid–base catalyzed trans-esterification was employed by Berchmans & Hirata (2008). Acid-catalyzed trans-esterification was followed by base-catalyzed trans-esterification and showed higher methyl ester yield than single stage or direct trans-esterification process.

Though Jatropha plants are found in different parts of the country, the analysis of oil content and production of biodiesel from Jatropha plants growing in Bhutan has not been tested. Investigating the potential of producing biodiesel from J. curcas L. oil and its physico-chemical properties can help produce biodiesel as an alternative source of fuel in the country and reduce the dependency on imported fuel. Therefore, this study aims to study the production of biodiesel and analyze its physico-chemical properties in Bhutan.

**Theoretical Framework**

According to Ramesh (2006), production of biodiesel is done through trans-esterification. The inedible oils, animal fats, waste food oil and byproducts of the oil refineries (Berchmans & Hirata, 2008; Rahman & Mashud, 2010) having large and branched triglycerides are esterified into smaller, straight chain molecules of methyl esters. Ethanol and methanol amongst other alcohol such as propanol, butanol and amyl alcohol are widely used for trans-esterification of biodiesel in the presence of alkali or acid or enzyme as catalysts. The methyl ester known as biodiesel is produced as an end product and glycerol as by-product.

The overall reaction is:

\[
\begin{align*}
\text{Triglycerid} + 3\text{CH}_3\text{OH} & \rightarrow \text{Biodiesel (Methyl ester)} + \text{Glycerol} \\
\end{align*}
\]

*Fig. 1: Trans-esterification in biodiesel production (Ramesh, 2006)*

**Materials and Methods**

**Sampling Area and Collection of Fruits**

Rrolong and Serichu under Tashigang and Mongar Districts respectively are located towards Eastern Bhutan with sub-tropical climatic condition where *J. curcas* L. plants are found growing in the wild. Ripen and dropped fruits were collected between November and December, 2012 and transported to Laboratory in Sherubtse College.
**Fig. 2:** Jatropha curcas L. plant with ripening (yellowish) fruits.

**Fig. 3:** Jatropha fruits and seeds (whitish decorticated seed)

**Treatment and extraction of oil**

Fruits were sun dried for three days, seeds separated by breaking the fruit and decorticated manually. Decorticated seeds were heated for 10 minutes to melt the oil content and milled for oil extraction. According to Rashid, Anwar, Jamil & Bhatti (2010) oil extraction has been done using hexane as solvent; however, in this study, Jatropha oil was extracted mechanically (Topare & Chopade, 2011) by using hand driven oil expeller (Raj Kumar Tech). The crude oil was boiled with water for partial removal of vitamins, minerals and proteins till all the water is being evaporated. It was then filtered using Watman filter paper.

**Trans-esterification, separation and purification**

Following the two-step acid-base catalyzed trans-esterification (Berchmans & Hirata, 2008), the biodiesel has been produced. The acid-catalyzed esterification was followed by base-catalyzed trans-esterification. In the acid trans-esterification, Sulphuric acid was used as the catalyst and methanol as reactant with certain percentage depending on the amount of oil used. Crude oil and Sulphuric-methanol solution were heated separately in the reaction glasses and mixed later. After one hour of reaction, the mixture was allowed to settle for 2 hours and removed the methanol–water fraction formed at the top layer. The biodiesel layer formed at the bottom of the reacting cylinder was then separated by using separating funnel.

Adopting the methods used by Berchmans & Hirata (2008), the biodiesel obtained from the first reaction was poured into the reaction cylinder and heated at 50 °C prior to the base-catalyst trans-esterification process. Sodium hydroxide as catalyst was dissolved in methanol and heated at 50 °C. The mixture was then reacted with first stage biodiesel for two hours at 65 °C with gentle agitation at 400 rpm.

The mixture was allowed to stand for more than two hours to settle the glycerol at the bottom with methyl ester layer of fatty acids (Biodiesel) on the top. The amber yellowish colored biodiesel layer was separated by separating funnel and purified by washing with warm water to remove methanol, residual catalyst and soaps with gentle agitation. The cloudy water layer formed at the bottom was removed after every 30 minutes. The washing process was repeated until the ester layer became clear. After the washing, the pH of the biodiesel layer was determined by using pH meter and adjusted to near 7. The biodiesel was then filtered.
through sand and salt filter to afford a clear amber-yellow liquid end product (Berchmans & Hirata, 2008).

**Testing of parameters**

Except for oil content, the parameters for the biodiesel such as flash point, pour point, density, etc., were determined in East Biodiesel Technology Pvt. Ltd., Kolkata, India.

**Result and Discussion**

The oil content of Jatropha seeds in this study was found to be 48.07%. While the oil content in Coimbatore, India was reported to be 20 – 30 % (Raja et al., 2011), Rahman & Mashud (2010) reported 50 – 60 % in Bangladesh, indicating the Jatropha seeds in the Serichu and Rolong area are suitable for biodiesel production.

The end product biodiesel extracted from Jatropha seeds was yellowish pale fluid which exhibited its parameters within the limits set by American Society for Testing and Methods (ASTM) and European Union (EN 14214) standard for bio-diesel (Table 1).

![Pale yellowish biodiesel (top layer) and darker glycerol layer](image)

**Fig. 4:** Pale yellowish biodiesel (top layer) and darker glycerol layer

The density (898 kg/m³) and acid value (0.48 mg KoH/gm) were found within the limits set by Eastern Biodiesel Technologies (P) Ltd., India and EN 14214. Fuel with higher density is desired as it has higher energy available for work per unit volume (Raja et al., 2011).

**Viscosity:** The atomization and formation of engine deposits in the ignition chamber of an engine depends upon the viscosity of the fuel (Knothe & Steidley, 2005). The biodiesel in this study exhibited high kinematic viscosity (5.6 mm²/s) at 40 °C which was within the ranges of ASTM D6751 (1.9 - 6.0 mm²/s). Although high viscosity of fuel indicates poor quality but it can be lowered by blending it with conventional diesel (Asoiro et al., 2011).
Table 1: Physico-chemical parameters of biodiesel extracted in this study

<table>
<thead>
<tr>
<th>Physico-chemical parameters</th>
<th>Biodiesel Test result</th>
<th>Eastern Biodiesel Technologies (P) Ltd.</th>
<th>ASTM D6751 (biodiesel)</th>
<th>EN 14214</th>
<th>ASTM D975 (Diesel fuel) (Kywe &amp; Oo, 2009)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density at 15 °C kg/m³</td>
<td>898</td>
<td>860-900</td>
<td>-</td>
<td>860-900</td>
<td>1.3 - 4.1</td>
</tr>
<tr>
<td>Kinematic viscosity at 40 °C</td>
<td>5.6</td>
<td>2.5 – 6</td>
<td>1.9 - 6.0</td>
<td>3.5 - 5.0</td>
<td>1.3 - 4.1</td>
</tr>
<tr>
<td>Flash Point (FP), °C</td>
<td>above 120</td>
<td>above 120</td>
<td>100 - 170</td>
<td>120 min</td>
<td>60 - 80</td>
</tr>
<tr>
<td>Pour point, °C</td>
<td>11</td>
<td>4 – 14</td>
<td>-15 to 10</td>
<td>-</td>
<td>(-35) - 15</td>
</tr>
<tr>
<td>Sulphur % by mass</td>
<td>0.004</td>
<td>0.005 max</td>
<td>0.05 max</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Sulphated Ash % by mass</td>
<td>0.075</td>
<td>0.02 max</td>
<td>0.02 max</td>
<td>0.02 max</td>
<td></td>
</tr>
<tr>
<td>Ester content % by mass</td>
<td>97%</td>
<td>96.5 Min</td>
<td>-</td>
<td>96.5% min</td>
<td></td>
</tr>
<tr>
<td>Acid value mg Koh/gm</td>
<td>0.48</td>
<td>0.5 max</td>
<td>0.50 max</td>
<td>0.50 max</td>
<td></td>
</tr>
<tr>
<td>Total Glycerol % by mass</td>
<td>0.15</td>
<td>0.25% max</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distillation at 90% recovery, °C</td>
<td>302</td>
<td>280 – 320</td>
<td>360 max</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Pour point:** At low temperature, biodiesel and diesel form wax crystals that can restrict the flow in a vehicle fuel system clogging fuel lines and filters (Forero, 2004). Pour point, the lowest temperature at which the biodiesel can flow was found to be 11 °C, within the limits set by Eastern Biodiesel Technologies (P) Ltd., India but bit higher than ASTM D6751. The pour point was found lower than the petro diesel (-35 to 15 °C) favoring the use as fuel in cold climatic conditions (Raja et al., 2011).

**Sulfur and sulphated ash content:** While sulfur content (0.004%) was found to be within the limits (0.005%) set for biodiesel, the sulphated ash content was found higher (0.075%) than the limits set (0.02%).

**Flash point:** Flash point is an important property to consider while handling and storage. The flash point of biodiesel was recorded above 120 °C and found within the limits of ASTM D6751 and EN 14214. Nevertheless, flash point was found higher than the petro diesel (60 – 80 °C) indicating less inflammable while handling and storage (Kywe & Oo, 2009).

**Conclusion**

The physico-chemical properties of biodiesel obtained in this study were within the limits of ASTM D 6751 and EN 1424 specifications, with appreciable oil content. Therefore, Jatropha oil may be used as an acceptable and suitable source for biodiesel production. However, more detailed studies on feasibility, market chain, environmental and social aspects need to be considered in the near future.

**Acknowledgements**

This work was done in Biotechnology Laboratory at Sherubtse College and was funded by the Royal University of Bhutan under the Annual University Research Grant for the year 2013.
References


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