

# PAKISTAN JOURNAL OF LIVESTOCK SCIENCES

Established  
2008

First Published  
2009

URL-<http://www.pjlsc.org.publication>

10<sup>th</sup> Published  
2018



Islamabad – Pakistan

[www.Pak.JLSc.Org](http://www.Pak.JLSc.Org)

**PUBLISHERS:**

**LIVESTOCK DEVELOPMENT FOUNDATION® (LDF)**

H.No.17, St. No.06, Muslim Town, Bhara Kahu, Islamabad

Cell: 0345-9727722

Email: [drmhafeez1949@gmail.com](mailto:drmhafeez1949@gmail.com)

|                           |   |
|---------------------------|---|
| © Copy Right              | All rights reserved with the Chief Editor   |
| Title:                    | Pakistan Journal of Livestock Sciences (Pak.J.L.Sc.)  |
|                           | Established-2008  |
|                           | First Published-2009  |
| ISSN (Regd.) No.          | 2077-933X   |
| ISSN-On-Line              | 2521-8697   |
| HEC Recognition           | Formal recognition awaited  |
| Abstracting & Indexing    | Regularly indexed with National Indexing and Abstracting Services (NIABS), Pakistan, Islamabad, since 2013.   |
| ISSN Regd. No. (NIABS)    | 2521-5647   |
| Present Publication No.   | Vol (X), No.10, December, 2018  |
| LDF approved document No. | No.LDF-PJLSc/10/2018  |
| Chief Editor              | Dr. Muhammad Hafeez<br>B.V. Sc, B.Sc. AH, M.Sc(Hons) AH, M.Sc. Veterinary Sciences U.S.A<br>President Livestock Development Foundation® (LDF), Regd. Islamabad                                    |
| Co-Editors:               | 1. Uzma Kanwal<br>M.Sc. Sociology, B.Ed. M.Ed. M.Phil (Education)<br>2. Iram Shahzadi<br>M.Phil Environment, M.Ed. M.Phil (Science Education)<br>3. Nadia Hafeez, BSCS, M.Ed., M.Phil (Education) |
| No. of Papers             | 09 (No 83 to 91)  |
| Pages (PP)                | 733-821   |
| No. of copies published   | 200   |
| Website                   | <a href="http://www.Pak.JLSc.Org">www.Pak.JLSc.Org</a>  |



|                         |  |             |
|-------------------------|--|-------------|
| Ad: Subscription Rates: | Full page – Inside (with prepared Ads:-) | Rs.15,000/- |
|                         | Full page – outer title                  | Rs.20,000/- |
|                         | Full page – inner title                  | Rs.15,000/- |
|                         | Half page – inside                       | Rs.10,000/- |
| Rates Inland (per copy) | Rs.300/- Institutions/Departments/NGOs   |             |
| Student Rate            | Rs.200/-                                 |             |
| International Rates     | US Dollars 20 each                       |             |
| UK: Pound Sterlings     | 10 each                                  |             |
| Canadian Dollar         | 15 each                                  |             |
| Australian Dollar       | 20 each                                  |             |
| FF                      | 30 each                                  |             |
| EUR                     | 20 each                                  |             |

- |   |  |
|---|--|
| 1. Computer IT Consultant   | Muhammad Waqar (MSCS-Pak)  |
| 2. Composing, Compilation, Computer Formatting/ And Graphic Work etc. | Mr. Sharafat Mahmood<br>For M/S Malik Ghulam Mustafa & Sons,<br>Bhara Kahu, ICT, Islamabad.<br>Ph.0312-8559966 |



## EDITORIAL

Al-Hamdo-Lillah, with the kind blessings of Almighty Allah, and Darood-o-Salaam on His Last of His Prophets, Muhammad ﷺ. The Editorial Board (EB) of Pak.JLSc. in its 10<sup>th</sup> and 13<sup>th</sup> meeting accorded approval of publishing this 10<sup>th</sup> volume, No.10, in hand.

With day-to-day petty improvements, each Research Article clearly will carry, on its face the date received, date-accepted and date-published.

We received 10 Research Articles while 09 cleared whereas 01 Abstract and 01 Article both of which, were not included, due to some clarifications. All these Research Articles were within our domain of subjects i.e. Livestock, Agriculture and Rural Development. Some articles have been cleared for next volume-XI (No.11) to be published in 2019, In.Sha.Allah.

Since our clientele have now crossed 485 and we are regularly distributing 80% on gratis bases, we have, as per policy recommendation of EB, reduced the number of copies to 200 as 4-5 people in one organization can benefit from one, fresh print-out, as well as to reduce cost of publishing.

We are confident that Higher Education Commission (HEC) will finally accord its formal recognition, long pending since 08 years. The ISSN, authorities are simultaneously requested to accord/upgraded “Y” category of this sustained effort since 2009.

**(Dr. Muhammad Hafeez)**  
Chief Editor



**CHIEF EDITOR**

**Dr. Muhammad Hafeez**

B.V.Sc, B.Sc AH, M.Sc (Hons) AH, M.Sc. Veterinary Sciences, U.S.A

**MEMBERS EDITORIAL BOARD**

|    |  |  |
|----|--|--|
| 01 | <b>Dr. Qurban Ali – Ph.D</b><br>Ex-Director, National Veterinary Laboratories, M/O Food Securities and Research, NARC, Islamabad | <b>Editor</b><br>Microbiology and Quality Assurance        |
| 02 | <b>Dr. M. Fatahullah Khan – Ph.D</b><br>Ex-Director, ASI, NARC, Islamabad  | <b>Editor</b><br>Small Ruminants                           |
| 03 | <b>Prof. Dr. Subhan Qureshi – Ph.D</b><br>Dean F/o Veterinary Sciences<br>Agricultural University, Peshawar                      | <b>Editor</b><br>Livestock Management and Dairy Production |
| 04 | <b>Dr. Tanveer Ahmed – Ph.D</b><br>Associate Professor/Chairman,<br>Faculty of Veterinary Sciences<br>PMAS-UAA-Rawalpindi        | <b>Editor</b><br>Academics, Syllabi and Animal Nutrition   |
| 05 | <b>Dr. Khizar Hayat – Ph.D</b><br>Ex-Director, Research (KPK)  | <b>Editor</b><br>Agriculture Sciences                      |
| 06 | <b>Dr. Tabinda Khawaja – Ph.D</b><br>Ex- Assistant Professor<br>AJK University Rawlakot.   | <b>Editor</b><br>Poultry Sciences                          |
| 07 | <b>Dr. Amtul Hafeez – Ph.D</b><br>Assistant Professor Education AIOU,<br>Islamabad   | <b>Editor</b><br>Education                                 |
| 08 | <b>Dr. Hina Fatima, Ph.D,</b><br>Assistant Professor (Environment),<br>AIOU, Islamabad   | <b>Editor</b><br>Environmental Sciences                    |
| 09 | <b>Dr. Muhammad Tariq Tunio – Ph.D</b><br>Assistant Professor, AIOU, Islamabad   | <b>Editor</b><br>Microbiology and Livestock Management     |
| 10 | <b>Dr. Hamid Irshad – Ph.D</b><br>Senior Scientific Officer,<br>NARC, Islamabad  | <b>Editor</b><br>Virology and Molecular Biology            |
| 11 | <b>Dr. Hajira, Ph.D</b><br>Assistant Professor, Home & Health Sciences,<br>AIOU, Islamabad.                                      | <b>Editor</b><br>Food and Nutritional Sciences             |
| 12 | <b>Dr. Shakira Ghazanfar Ph.D.</b><br>Senior Scientific Officer,<br>Plant Genetics Research Institute,<br>NARC, Islamabad        | <b>Editor</b><br>Bio-Technology                            |

### **RECENT INSTRUCTIONS/GUIDE LINES FOR CONTRIBUTORS**

1. The original Articles/Research papers be sent on A-4 size paper with one inch margin on both right and left sides. The text should be on Font No.11.
2. The standard format should be abstract, introduction, review of literature, material and methods, result, discussion, conclusions and recommendations followed by references/literature cited (in alphabetical order). Reference must appear in the text and preferably for the last 10 years.
3. Number of tables be restricted to minimum possible.
4. Two printed (hard copies) and a CD (soft copy) may also be enclosed to quicken the process of References evaluation(s).
5. Colour prints, photographs, if indispensable, (include 200 prints/200 photographs with colour scheme advised). This is negotiable.
6. Reference be kept limited (Not more than ten) preferably for the last 5-10 years. Standard format be adopted.
7. Contribution of Rs.3500/- (three thousand five hundreds only)/article/paper be enclosed upto four pages. Each extra page will cost Rs.1000/- (one thousand only).
8. Abstracts be limited to one para of 100-150 words in between the A-4 paper supported in separate line, with key words for example.  
Microbiology: Coliform bacilli; E-coli; incidence of food contamination, Pakistan.  
Chemistry; Physico-Chemical analysis; algae, lotus lake water – Pakistan.
9. First screening of the papers will be within one month and acceptance/otherwise will be communicated after a period of 30 (THIRTY) days.
10. Changes/Amendments/Reviewers comments and advises must be attended by the contributor(s) authors and final draft with CDs, be re-submitted to the Chief Editor within 14 days (hard copies, of course).
11. Duplications be avoided.
12. Advertisements be sent according to subscribed rates.
13. Selected Scientific paper/Articles will be subjected to PEER REVIEWING simultaneously by the local as well as Foreign Referees, in accordance with the guidelines of HEC Islamabad Pakistan.
14. Year Schedule of Processing Articles of Each Volume is also enclosed.
15. Publishing PJLSc. upto this Volume-X (No.10), 2018 is on Annual basis. The Editorial Board in its 10<sup>th</sup> and 11<sup>th</sup> meeting agreed to publish PJLSc. Twice a year (on Bi-Annual Basis), immediate after the formal approval of HEC is obtained, with possible Financial Assistance.
16. We are now available on [www.Pak.JLSc.Org](http://www.Pak.JLSc.Org) as well as On-Line, URL-  
<http://www.pjlsc.org.publication> and email [drmhafeez1949@gmail.com](mailto:drmhafeez1949@gmail.com)

**PROPOSED ANNUAL SCHEDULE OF PROCESSING ARTICLES**  
**Pakistan Journal of Livestock Sciences (PJLSc.)**  
**Vol-XI, No.11 (2019)**

---

|  |                           |
|--|---------------------------|
| Arrival of Articles                        | January – May, 2019       |
| Submission to Referees                     | June – July, 2019         |
| Corrections expected                       | July – August, 2019       |
| 13 <sup>th</sup> Editorial Board Meetings  | July – August, 2019       |
| Referring back to Authors                  | August – September, 2019  |
| Final Acceptance                           | September – October, 2019 |
| Draft typed                                | October – November, 2019  |
| Proof readings                             | November – December, 2019 |
| Final printing                             | December, 2019            |
| (Pre-binding proof reading)                |                           |
| Corrected published                        | December, 2019            |
| Post-printing reading<br>(addendum if any) | Last week                 |
| Dispatch to clientele                      | December, 2019            |

NB: Acceptance is accorded only when Research Articles are cleared by Respected Referees (both reviewed and peer reviewed)

---

**CELEBRATING  
DECADE OF PROGRESS  
PAKISTAN JOURNAL OF LIVESTOCK SCIENCES  
ISLAMABAD  
2008-2018**

| Article No. | CONTENTS  | PAGES   |
|-------------|---|---------|
| 83          | <b>COMPARITIVE STUDY OF ECONOMIC TRAITS OF NILI RAVI BUFFALOES IN DISTRICT JHELM AND OKARA OF THE PUNJAB PROVINCE</b><br>Syed Hassan Ali <sup>1</sup> , M.Tariq Tunio <sup>2</sup> and Muhammad Hafeez <sup>3</sup>   | 733-748 |
| 84          | <b>THE PREVALENCE OF EQUINE DISEASES IN OKARA AND ITS SURROUNDING AREA</b><br>Ashfaq Ahmad <sup>1</sup> , M. Tariq Tunio <sup>2</sup> and Muhammad Hafeez <sup>3</sup>  | 749-761 |
| 85          | <b>RECENT UPDATE OF LIVESTOCK SECTOR OF PAKISTAN</b><br>Mansoor Ahmed Khan <sup>1</sup> and Muhammad Hafeez <sup>2</sup>  | 762-770 |
| 86          | <b>INCIDENCE OF BLOOD PROTOZOANS IN DAIRY CATTLE IN KOHAT REGION, KHYBER PAKHTUNKHWA, PAKISTAN</b><br>Zabita Khan <sup>1</sup> , Shams-ul-Hayat <sup>1</sup> , Muhammad Rashid Khan <sup>1</sup> , Shabina Begum <sup>2</sup> , Muhammad Jamil Khan <sup>3</sup> and Bahrullah Khattak <sup>4</sup> | 771-776 |
| 87          | <b>AN OVERVIEW OF THE TREND AND STATUS OF MATRIC AND FA STUDENTS FOR AGRICULTURE AND LIVESTOCK COURSES IN AIOU: PAPER EVALUATION OF FIVE SEMESTERS</b><br>Muhammad Hafeez <sup>1</sup> , Uzma Kanwal <sup>2</sup> , Nadia Hafeez <sup>3</sup> and Iram Shahzadi <sup>4</sup>                        | 777-784 |
| 88          | <b>THE IMPACT OF FDI ON THE GDP GROWTH IN AGRICULTURAL RELATED SECTORS OF CONSTRUCTION, TRADE AND TRANSPORT OF PAKISTAN</b><br>Basharat Mehmood <sup>1</sup> , Arshad Ali <sup>2</sup> , Mahmood <sup>3</sup> and Sarfraz Ahmad <sup>4</sup>  | 785-797 |
| 89          | <b>THE POSITIVE IMPACT OF AGRICULTURE AND LIVESTOCK COURSES ON THE MATRIC AND FA STUDENTS BASED ON PAPER EVALUATION RECENT YEARS, OF AIOU, ISLAMABAD</b><br>Bushra Tabossum <sup>1</sup> , Kaleemullah <sup>2</sup> and Muhammad Hafeez <sup>3</sup>  | 898-903 |
| 90          | <b>A COMPARATIVE STUDY OF MARKS OBTAINED BY FA STUDENTS IN ASSIGNMENTS OF AGRICULTURE COURSE CODE 349 FOR SPRING-2018 SEMESTER, RAWALPINDI REGION, AIOU, ISLAMABAD</b><br>Uzama Kanwal <sup>1</sup> , Nadia Hafeez <sup>2</sup> and Muhammad Hafeez <sup>3</sup>                                    | 804-813 |
| 91          | <b>AN UPDATED APPROACH TO THE ECONOMICAL ASPECT OF A DAIRY BUFFALO UNIT, IN RURAL, ISLAMABAD</b><br>Tabinda Khawaja <sup>1</sup> and Muhammad Hafeez <sup>2</sup>   | 814-821 |



## COMPARITIVE STUDY OF ECONOMIC TRAITS OF NILI RAVI BUFFALOES IN DISTRICT JHELMUM AND OKARA OF THE PUNJAB PROVINCE

Syed Hassan Alil<sup>1</sup>, M.Tariq Tunio<sup>2</sup> and Muhammad Hafeez<sup>3</sup>

### ABSTRACT

This study was launched to investigate the season based impact of Winter born (W), Summer born (S) and Mild Season born (Md) buffaloes kept at Okara and Jhelum Government Dairy Farms for the economic traits namely (i) Age at First Service, (ii) Lactation period (Days), (iii) Milk Yield Per Lactation (liters) (iv) Gestation Period and (v) Inter-Calving Interval together with dry period, for First and Second Calver buffaloes. The total number of Buffalo heifers examined were N=50 at each farm out of which Winter Born (W) (n=14) showed mean values of age at first service (days)  $1190 \pm 4.29$  with the range of max: 1128 and min: 1075 days. Simultaneously summer born buffalo heifers (n=21) showed mean value of age (days), at first service,  $1127.33 \pm 14.33$  with the range of max: 1198 and min 1028 while the Mild/season born heifers (n=15) showed mean age at first service as  $1113.86 \pm 1.28$  days (with the range of max: 1169 days and min: 1060 day) respectively. The results of Gestation Period (days) of experimental buffaloes at Okara (N=50), when examined season wise, the winter born (W=14) showed mean values of 309.57 days  $\pm 2.50$  days, (with the range of max 314 and min: 306 days). The Mild/Mediocre season born buffaloes after impregnation, showed mean gestation period of 309.13 days  $\pm 2.45$  (with the range of max: 313 and min: 305 days respectively).

**Key Words:** Economic Traits, NILI-RAVI Buffaloes, Punjab, Pakistan.

Article received: May-2018

Accepted: August-2018

Published: December-2018

### INTRODUCTION:

Livestock is an important segment of agriculture sector which contributed 58.6 percent to the agriculture value added and 11.6 percent to the national GDP during 2015-16 as compared to 56.4 percent and 11.7 percent during the previous year. The gross value addition of livestock at constant cost factor was increased from Rs.1247 billions during 2014-15 to Rs 1292 billions in the year 2015-16 showing an increase of 3.6 percent (Livestock wing 2014-15 and 2015-16). More than 8.0 million rural families were involved in raising livestock. Pakistan having a buffalo population of 35.6 million which produced 32.18 million tons of milk for human consumption, as reported by Wasti Ejaz (2014-15).

The recent information on buffalo population reported that there were 36.98 million buffaloes with a growth rate of 2.97 percent during 2015-16 and 38.16 million during 2016-17 in the country. The figers for buffalo population in Punjab

<sup>1</sup>Incharge Government Dairy Farm, Jhelum.

<sup>2</sup>Assistant Professor, Department of Agriculture Sciences, AIU, Islamabad.

<sup>3</sup>President LDF, Islamabad.

province were recorded as 24.33 millions for 2015-16 and 25.13 millions for the year 2016-17 as documented by Wasti Ejaz (2015-16 and 2016-17) as well as Mansoor Ahmed *et al.*, (2017) respectively.

The water buffalo contributed substantially to the economy of many countries in tropic and sub-tropic regions including Indian sub-continent, China, South-East Asia, Mediterranean, South and Central America, Africa and Australia. Buffaloes are classified into two distinct types as River and Swamp buffaloes while the river type is distributed largely in Indian sub-continent, Mediterranean region, Caribbean, Africa and South America, the swamp buffalo is mostly found in China and South East Asia (Kumar *et al.*, 2007).

The Nili-Ravi breed of buffalo is classed as river type and is the best milk producer amongst other breeds of buffaloes in the world. These have wedge shaped, massive frame, small curly horns and well developed buffaloes eyes, often have white markings on the forehead, face, legs and white switch of tail. Buffaloes with such markings are highly desired and popularly called “Panj Kalia” (Warriach, Channa, and Ahmad, 2008).

Among the two established breeds of buffaloes in Pakistan, the Nili-Ravi breed originated in the valleys of Sutlej and Ravi rivers, is dominant in the Punjab province. The Second important Breed of Buffaloes, Known as Kundi Buffaloes of Sindh. This breed has now spread over all parts of Pakistan including NWFP (now known as Khyber P.K) Baluchistan and Kashmir. Nili-Ravi buffaloes performed far better than local and crossbred cattle in Muzaffarabad, Azad Jammu and Kashmir (Kuthu, 2007), indicating its adaptation to various environmental conditions.

Pakistani buffaloes could have the potential of producing over 5,000 liters of milk per lactation, under efficient breeding, feeding and health care program. Nili Ravi is the best breed at national and international level in terms of its production potential, reflected in average milk yield per lactation of 2,430 liters, while some high yielding Nili-Ravi also produced 3000-5000 liters/lactation as reported by Bilal, Suleman and Raziq., (2006).

Buffalo milk is richer than cow's milk, especially in terms of fat percentage, are more hardy animals and can be maintained under complete confinement, the

milk is economically beneficial to producers, processors, consumers and more adaptable to harsh environment.

Limited research has been done in the past to evaluate the environmental factors affecting the performance of Nili-Ravi buffalo in Pakistan. In a previous study, performance of Nili-Ravi breed was evaluated at two institutional herds for 1951 - 1978 and it was observed that herd, year and season of calving and parity affected ( $P < 0.01$ ) some productive and reproductive traits (milk yield, lactation length, days open, calving interval and services per conception) along with the genetic parameters as reported by Sarwar *et al.*, (2009), Bashir *et al.*, (2007) and Pasha (2013).

Countable studies are available on various performance traits of buffaloes in irrigated regions of Punjab. However, limited data is found in Potohar region of Punjab. The present study has thus been planned in Jhelum and Okara Districts of Punjab to compare the performance of Buffaloes in different environmental localities.

The district of Jhelum stretches from the river Jhelum almost to the Indus river. It is lying at 32°56' North latitude and 73°44' East longitude, located at 1-hour and 30 minutes' drive from the Capital of Pakistan Islamabad, and 3 hours' drive from the heart of Punjab Lahore. District Jhelum has a humid subtropical climate (Köppen climate classification *Cfa*) and is extremely hot and humid in Summer, while cold and generally dry in winter. The maximum recorded temperature in the pre-monsoon season of April to June averaged 49.2 °C (120.6 °F), whereas in winter the minimum temperature recorded was -0.6 °C (30.9 °F) with average annual rainfall is about 850 millimeters (33 in) much below the required quantity, given the extremely high evaporation levels.

The Okara District shares boundary on the South by Bahawalnagar, on the South-West by Pakpattan, on the west by Sahiwal, on the north by the districts of Faisalabad and Nankana Sahib, on the Near-East & Far-North by Kasur and on the South-East by Fazilka (India), located on Multan Road, 110km from Lahore. The climate of the district is hot in summer and cold in winter. May and June are the hottest months with maximum temperature reaching 44°C. January is the

coldest month with minimum temperature falling to 2C°. The average annual rainfall is 200 mm. The Thermo Neutral Zone (TNZ) of dairy animals ranges from 16°C to 25°C, within which they maintained a physiological body temperature of 38.4-39.1°C. However, air temperatures above 20-25°C in temperate climate and 25-37°C in a tropical climate like in India, enhance heat gain beyond that lost from the body and induces heat stress (Sunil Kumar, Kumar A, and Kataria 2011). Harsh environmental conditions, poor management practices, lack of green pastures, poor nutrition practices and lack of proper prophylactic medications appears to be the major causes of low production of milk in Buffaloes population.

### **RESEARCH METHODOLOGY:**

The study was planned in Jhelum and Okara Districts of Punjab province, to compare the productive and reproductive parameters. Okara district being the homeland and most suitable area for Nili Ravi buffalo raising whereas Jhelum District being typical Potohar area of the Punjab province with undulating grounds and less vegetation.

The study was carried out in buffaloes kept at Government Dairy Farms at Jhelum and Okara districts to determine the effect of climate on productive and reproductive parameters during 2016 and 2017 as per our plan of work. Approximately 800 buffaloes were available in both the government dairy farms. Buffaloes were fed with forage (hay and green fodder), silage and concentrate ration 2 to 3 times a day and left to graze on nearby pasture during the study period. All experimental buffaloes (N=50) at each Farm were vaccinated against four endemic diseases namely:- (i) Foot and Mouth disease (ii) Black Quarter Disease (iii) animal health coverage were 100%. and (iv) Hemorrhagic Septicemia (v) and Anthrax with potent vaccines available at the farm. All experimental buffaloes were 100% dewormed with anthelmintics of choice. All the experimental buffaloes were 100% sprayed against ectoparasites with acaricide of choice.

Seasonal Data recorded information (Primary data) was collected from Inventory Register pertaining to Buffaloes given birth:-

- i. Winter Season (n=14)-W
- ii. Summer Season (n=21)-S
- iii. Moderate Season (n=15)-Md

The parameters identified and targeted were:-

- a. Age at first Service (days)
- b. Gestation period (days)
- c. Milk Yield (Liters) per lactation \
- d. Lactation period (days)
- e. Age at first calving (days)
- f. Service period (days)

Similar data was collected in District Jhelum buffaloes farm Season based:

- i. Winter Season (n=16)-W
- ii. Summer Season (n=23)-S
- iii. Moderate Season (n=10)-Md

With similar parameters as of Okara being :-

- a. Age at first Service (days)
- b. Gestation period (days)
- c. Milk Yield (Liters) per lactation \
- d. Lactation period (days)
- e. Age at first calving (days)
- f. Service period (days)

Data thus collected from (N=50) buffaloes at Okara farm and N=50 at Jhelum government dairy farms were evaluated for impact on these parameters both for first calvers and second calvers to satisfy our approach. Simultaneously the ANOVA model for our Statistical approach was as under:-

The collected data was analyzed by using the statistical package SPSS (V-16) and e-Views-07 as well as e-Views-09. We also analyzed multivariate animal model for correlations and Least Significant Difference (LSDs) in our study with the help of Excel Analysis of Variance (ANOVA).

$$Y_{ij} = \mu + F_i + e_{ij}$$

Where:

$Y_{ij}$ : traits' value measured on  $j^{\text{th}}$  animal in  $i^{\text{th}}$  farm

$\mu$ : overall mean.

$F_i$ : effects of farms

$e_{ij}$  is the residual effect, distributed as  $N(0, \sigma^2)$ .

The mean differences were compared using least significant difference (LSD) at  $P < 0.05\%$  level of significance.

## RESULTS AND DISCUSSION:

### a. Age at First Service (Okara Buffaloes)

The total number of buffalo heifers examined were N-50, out of which Winter Born (W) ( $n=14$ ) showed mean values of age at first service (days) as  $1190 \pm 4.29$  with the range of max: 1128 and min: 1075 days. Simultaneously summer born buffalo heifers ( $n=21$ ) (S) showed mean value of age (days), at first service as  $1127.33 \pm 14.33$  with the range of max 1198 and min: 1028 while the Mild/season (Md) born heifers ( $n=15$ ) showed mean age at first service as  $1113.86 \pm 1.28$  days (with the range of max: 1169 days and min: 1060 day) respectively as appear in table No:01

### b. Gestation period (Okara Buffaloes) First Calvers).

The results of Gestation Period (days) of experimental buffaloes at Okara ( $N=50$ ), when examined season wise, the winter born ( $W=14$ ) showed mean values of  $309.57 \pm 2.50$  days (with the range of max 314 and min 306 days). The Mild season born (Md) buffalo after impregnation showed mean gestation period of  $309.13 \pm 2.45$  (with the range of max: 313 and min: 305 days respectively as presented in table No-02.

### c. Milk Yield per lactation (liters) Okara Buffaloes (First Calvers)

The milk yield recorded for the total length of lactation period (of  $N=50$ , first calvers) indicated in winter born (W) ( $n=14$ ) mean quantity as  $2142.86 \pm 35.10$  liters (with the range of max:2175 and min: 2063 liters) and summer born (S) ( $n=21$ ) evidenced mean quantity of milk produced as  $2146.05 \pm 35.17$  liters (with the range of max. 2203 and min.2091 liters) while the Mild Season (Md)  $n=15$  produced mean quantity of 2162.5 liters  $\pm 22.10$  (with the range of max. 2196 and min. 2129 liters) respectively as detailed in table No.03.

**d. Duration of lactation (Days), in Okara (First Calvers)**

The total length (duration) of lactation (days) of experimental buffaloes (N=50), out of First calvers at Okara Winter born (W), (n=14) indicated mean number of  $285.5 \pm 5.20$  days with the range of max: 296 and min: 293 days and Summer born (S), n=21, showed mean number of lactation as  $287.81 \pm 4.26$  days (with the range of max.292 and min. 278 day) while Mild season born (Md) buffaloes showed mean lactation days of  $283.50 \pm 4.12$  days (with the range of max. 288 and min. 274 days) respectively, as appears in table No-04.

**e. Gestation Period (Days) of Okara (Second Calvers)**

The gestation period recorded in buffaloes (N=50), Second Calvers of Winter born (n=14) mean duration (days) was  $309.86 \pm 2.60$  (with the range, max: 312 and min:306 days) and Summer born buffaloes (S), n=21 revealed mean gestation period of  $310.47 \pm 2.71$  days (with the range max, 315 and min 305 days) while Mild Season born buffaloes showed mean gestation period of  $309.50 \pm 2.76$  days (with the range of max: 316 and min=303 days) respectively, presented in table No. 05.

**f. Milk Yield (Liters) of buffaloes at Okara (Second Calvers):**

The mean value of milk yield (liters) for Winter (W), Summer (S) and Mild (Md) seasons observed was  $2261.78 \pm 43.10$ ,  $2258.81 \pm 27.21$  and  $2263.00 \pm 32.10$  liters with the range of 2305-2180, 22294-2213 and 2308-2218 respectively, tabulated in table No.06.

**g. Lactation Period (days) of Okara (Second Calvers):**

The lactation period (days) observed and recorded in the experimental buffaloes (N=50), Second Calvers, for all the three seasonal births (i) Winter (W) (ii) Summer (S) AND (iii) Midl (Md) mean number of (i) max: 310 and min:289 (ii) max: 305 and min 291: and (iii) max: 302 and min:s 286 days as detailed in table No-07.

**h. Service Frequency per conception of Buffaloes of Okara (both first and Second Calvers)**

The service frequency (times) for first calves in winter born (n=14) mean times  $1.48 \pm$  (with the range of max.02 and min.01) while these values as second



calvers was  $1.5 \pm$  (with the range of max:03 and min: 01. The mean service frequency (times) for summer (S) born buffalo was  $1.5 \pm 0.11$  while Mild (Md) mean time service was  $1.48 \pm 0.12$ . These values for second calvers was  $1.5 \pm 0.14$ ,  $1.23 \pm 0.15$  and  $1.13 \pm 0.17$  times, respectively presented in table No. 08.

**i. Dry Period duration (days) of buffaloes, kept at Okara:**

The dry period observed and recorded in experimental buffaloes was mean days for S=  $122.76 \pm 25.16$  for W=  $118.36 \pm 30.22$  and for Mild as  $119.33 \pm 25.00$  days, the range for these three groups S, W and Md was 171-94, 175-88 and 164-88 being max: and min respectively, as displayed in table No.09.

**j. Inter calving interval of buffaloes of Okara:**

The inter calving interval of Groups S, W and Md was  $407.19 \pm 42.10$ ,  $403.86 \pm 30.27$  and  $403.06 \pm 24.11$  days with ranges being max.498 and min.373 for S, 462-374 for W and 444-371 days for Md groups respectively presented in table No. 10.

**k. Age at First Lactation (days) of buffaloes kept at Jhelum First Calvers:**

The First calvers buffaloes of Jhelum Government Dairy Farm for winter (W) born, Summer (S) born and Mild Season born (Md) was observed and recorded as  $1177.62 \pm 14.23$ ,  $1184.78 \pm 15.10$  and  $1152.60 \pm 8.22$  days with ranges of 1409-1005 days for W, 1453-1028 days for S and 1273-1060 days for Md buffaloes detailed as max: and min: in table No.11.

**l. Gestation Period (days) of First Calvers buffaloes at Jhelum:**

The first calvers buffaloes at Jhelum Farm showed mean gestation period of  $310.06 \pm 2.50$ ,  $309.96 \pm 2.49$  and  $308.70 \pm 2.54$  days with ranges of 315-307 for W, 315-303 for S and 311-305 days for Md groups, as presented in table No. 12.

**m. Milk Yield (liters) first calvers buffaloes of Jhelum:**

The milk yield (liters) per lactation mean values for Winter (W), Summer (S) and Mild (Md) groups was recorded as  $1768.69 \pm 17.10$  (the range being max:2173 and min: 1689 liters)  $1971.0 \pm 15.29$  (the ranges being max 2186 and min 1723 liters) and  $1842.80 \pm 37.25$  liters per lactation (the range being max;2175 and min:1705 liters) respectively, as laid in the table No.13.



**n. Lactation Period (days) of First Calvers buffaloes of Jhelum:**

The total duration of milk (lactation period) in days was observed and recorded as mean value of  $W=277.36\pm6.28$  for  $S=280\pm8.10$  days and for Mild group as  $280.4\pm6.27$  day with maximum and minimum ranges given in table No.14.

**o. Gestation period (Days) of 2<sup>nd</sup> Calvers Buffaloes of Jhelum Farm:**

The total gestation period (length of gestation) in Days for second calver buffaloes at Jhelum Government Dairy Farm for groups W, S and Md observed and recorded mean count were  $310.5\pm2.60$ ,  $311.0\pm3.29$  and  $310.5\pm 2.10$  days with ranges presented in table No.15.

**p. Milk Yield (liters) of Second Calvers buffaloes of Jhelum Farm:**

The mean values of milk yield (liters) per lactation of second calver buffaloes of Jhelum Farm for W, S and Md groups were  $1871.87\pm15.29$ ,  $2092.87\pm14.99$  and  $2152.10\pm16.91$  liters with max: and min: ranges as detailed in table No.16.

**q. Lactation period (Days) of Second Calvers buffaloes Jhelum:**

The total duration of lactation in days was observed with mean values for W, S and Md groups as  $281.70\pm4.26$ ,  $295.78\pm10.20$  and  $297.30\pm3.3$  days respectively with ranges of max: and min: laid down in table No-17.

**r. Dry Period (days) of buffaloes (at Jhelum):**

The dry period (the duration of buffalo, without milk) was observed and recorded mean count in groups W, S and Md as  $183.56\pm19.86$  days,  $147.08\pm13.10$  days and  $153.3\pm22.03$  days respectively with ranges of 326-88 days for W, 308-87 for S and 343-88 days for Md groups daily presented in table No.18

**s. Inter calving interval of buffaloes kept at Jhelum Farm:**

The inter calving interval was recorded as  $461.31\pm19.30$  days for W,  $422.13\pm 13.24$  for S and  $433.70\pm 25.16$  days respectively with ranges of max: and min: for each groups displayed table No.19.

**t. Analysis of Variance (ANOVA) Results of the study:**

The data was analyzed for each economic trait of (i) Age at first Service encoded AGF (ii) Dry Period (DPE), (iii) Gestation Period (GP) (iv) Inter calving Interval (IC) (v) Lactation Days (LD), (vi) Milk Yield (Liters) MYL, and (vii) Service

times per Estrous (SPE), using ANOVA, both ANOVA Welch Test and ANOVA F test and found that the economic trait had significant effect  $P (0.000)$  on per performance both productive (milk production) as well as reproduction (gestation period, Dry period and Days of lactation), both at Okara and Jhelum buffaloes. The milk yield had positive and significant effect on Second calvers than first calvers as appears in the tables No-20 (A), 20-(B) and 20(C) of the results.

**Table No-01 showing the summarized age at first service (days) mean values of experimental buffaloes of Okara Govt. Farm 2016-17.**

| Sr. # | Season | n=0 | Age at First Service |      |         |       |       |
|-------|--------|-----|----------------------|------|---------|-------|-------|
|       |        |     | Max.                 | Min. | Mean    | SD    | SE    |
| 1     | Winter | 14  | 112821               | 1075 | 1190    | 8.58  | 4.29  |
| 2     | Summer | 21  | 1198                 | 1028 | 1127.33 | 28.66 | 14.33 |
| 3     | Mild   | 15  | 1169                 | 1060 | 1113.86 | 2.56  | 1.28  |

Source:- Thesis Data of Hassan Ali Shah, M.Sc (Hons)/M.Phil LM DAS,AIOU Islamabad 2017.

**Table No-02 showing the season based summarized gestation period (days) mean values of experimental buffaloes of Okara Govt Farm 2016-17.**

| Sr. # | Season | n=0 | Gestation Period (Days) |      |        |      |      |
|-------|--------|-----|-------------------------|------|--------|------|------|
|       |        |     | Max.                    | Min. | Mean   | SD   | SE   |
| 1     | Winter | 14  | 313                     | 305  | 309.57 | 5.65 | 2.50 |
| 2     | Summer | 21  | 314                     | 306  | 309.21 | 5.72 | 2.70 |
| 3     | Mild   | 15  | 313                     | 305  | 309.13 | 5.62 | 2.45 |

Source:- Thesis Data of Hassan Ali Shah, M.Sc (Hons)/M.Phil LM DAS,AIOU Islamabad 2017

**Table No-03 showing the Season based Milk Yield (Liters) mean values of Experimental buffaloes of Okara Govt Farms 2016-17 (First Calvers)**

| Sr. # | Season | n=0 | Milk Yield (Liters) |      |         |       |       |
|-------|--------|-----|---------------------|------|---------|-------|-------|
|       |        |     | Max.                | Min. | Mean    | SD    | SE    |
| 1     | Winter | 14  | 2175                | 2063 | 2142.86 | 79.19 | 35.10 |
| 2     | Summer | 21  | 2203                | 2091 | 2146.05 | 79.21 | 35.17 |
| 3     | Mild   | 15  | 2196                | 2129 | 2162.5  | 47.37 | 22.10 |

Source:- Thesis Data of Hassan Ali Shah, M.Sc (Hons)/M.Phil LM DAS,AIOU Islamabad 2017

**Table No-04 showing the Season based Days of lactation of Experimental buffaloes of Okara Govt. Farm 2016-17 (First Calvers)**

| Sr. # | Season | n=0 | Days of lactation |      |        |       |      |
|-------|--------|-----|-------------------|------|--------|-------|------|
|       |        |     | Max.              | Min. | Mean   | SD    | SE   |
| 1     | Winter | 14  | 293               | 276  | 285.5  | 12.02 | 5.20 |
| 2     | Summer | 21  | 292               | 278  | 287.81 | 9.89  | 4.26 |
| 3     | Mild   | 15  | 288               | 274  | 283.50 | 9.62  | 4.12 |

Source:- Thesis Data of Hassan Ali Shah, M.Sc (Hons)/M.Phil LM DAS,AIOU Islamabad 2017.

**Table No-20 Showing the Descriptive Statistics of each variable (Economic traits) both at Okara and Jhelum experimental buffaloes-2017.**

|              | AGF      | DPE      | GP        | IC       | LD        | MYI       |
|--------------|----------|----------|-----------|----------|-----------|-----------|
| Mean         | 1128.214 | 120.8684 | 309.7037  | 408.4211 | 287.8148  | 2199.333  |
| Median       | 1125.000 | 113.0000 | 310.0000  | 406.0000 | 289.0000  | 2175.000  |
| Maximum      | 1190.000 | 216.0000 | 313.0000  | 498.0000 | 310.0000  | 2305.000  |
| Minimum      | 1075.000 | 88.00000 | 305.0000  | 371.0000 | 203.0000  | 2063.000  |
| Std. Dev.    | 29.31048 | 28.49198 | 2.034601  | 29.44682 | 18.49124  | 68.98551  |
| Skewness     | 0.335621 | 1.331767 | -0.370547 | 0.906702 | -3.651006 | -0.005299 |
| Kurtosis     | 2.952507 | 4.657597 | 2.588850  | 3.546283 | 17.81110  | 1.830627  |
| Jarque-Bera  | 0.264147 | 15.58324 | 0.808050  | 5.679198 | 306.7742  | 1.538488  |
| Probability  | 0.876277 | 0.000413 | 0.667628  | 0.058449 | 0.000000  | 0.463363  |
| Sum          | 15795.00 | 4593.000 | 8362.000  | 15520.00 | 7771.000  | 59382.00  |
| Sum Sq. Dev. | 11168.36 | 30036.34 | 107.6296  | 32083.26 | 8890.074  | 123734.0  |

Source:- Thesis Data of Hassan Ali Shah, M.Sc (Hons)/M.Phil LM DAS,AIOU Islamabad 2017

**Table 20-B Statistical Analysis**

| Test for Equality of Variances Between Series |       |           |                      |                        |
|---|-------|-----------|----------------------|------------------------|
| Date: 01/16/18 Time: 02:11                    |       |           |                      |                        |
| Method  |       | df        | Value                | Probability            |
| Bartlett                                      |       | 6         | 178.8933             | 0.0000                 |
| Levene  |       | (6, 178)  | 26.94830             | 0.0000                 |
| Brown-Forsythe                                |       | (6, 178)  | 15.85555             | 0.0000                 |
| Category Statistics                           |       |           |                      |                        |
| Variable                                      | Count | Std. Dev. | Mean Abs. Mean Diff. | Mean Abs. Median Diff. |
| AGF   | 14    | 29.31048  | 21.67347             | 21.50000               |
| DPE   | 38    | 28.49198  | 21.94598             | 21.44737               |
| GP  | 27    | 2.034601  | 1.662551             | 1.629630               |
| IC  | 38    | 29.44682  | 22.96953             | 22.89474               |
| LD  | 27    | 18.49124  | 9.168724             | 9.111111               |
| MYI   | 27    | 68.98551  | 60.83951             | 57.66667               |
| SPE   | 14    | 30.68056  | 25.51020             | 24.14286               |
| All   | 185   | 706.0236  | 23.25661             | 22.54595               |

Source: Statistical analysis, through computer with date and time

**Table-No-20-C Showing ANOVA Results in the study area of Okara and Jhelum buffaloes (2017).**

Shelton Sanders (2017)

| Test for Equality of Means Between Series |       |              |            |                   |
|---|-------|--------------|------------|-------------------|
| Date: 01/16/18    Time: 02:55             |       |              |            |                   |
| Method                                    |       | df           | Value      | Probability       |
| Anova F-test                              |       | (6, 178)     | 12437.21   | 0.0000            |
| Welch F-test*                             |       | (6, 56.6452) | 5342.735   | 0.0000            |
| *Test allows for unequal cell variances   |       |              |            |                   |
| Analysis of Variance                      |       |              |            |                   |
| Source of Variation                       |       | df           | Sum of Sq. | Mean Sq.          |
| Between                                   |       | 6            | 91500098   | 15250016          |
| Within                                    |       | 178          | 218256.5   | 1226.160          |
| Total                                     |       | 184          | 91718355   | 498469.3          |
| Category Statistics                       |       |              |            |                   |
| Variable                                  | Count | Mean         | Std. Dev.  | Std. Err. of Mean |
| AGF                                       | 14    | 1128.214     | 29.31048   | 7.833556          |
| DPE                                       | 38    | 120.8684     | 28.49198   | 4.622010          |
| GP  | 27    | 309.7037     | 2.034601   | 0.391559          |
| IC  | 38    | 408.4211     | 29.44682   | 4.776905          |
| LD  | 27    | 287.8148     | 18.49124   | 3.558641          |
| MYI                                       | 27    | 2199.333     | 68.98551   | 13.27627          |
| SPE                                       | 14    | 98.28571     | 30.68056   | 8.199724          |
| All                                       | 185   | 609.7243     | 706.0236   | 51.90789          |

Source:- Thesis Research ANOVA Results of Hassan Ali Shah, M.Sc (Hons)/ M.Phil LM DAS, AIOU Islamabad 2017.

## DISCUSSION:

Results of this study evidenced age at first service in Okara (of Buffalo heifers), cumulatively average mean values  $1143.66 \pm 8.3$  days for Okara and  $1171.66 \pm 16.66$  for Jhelum with mean difference of 28 days as significant of  $P < 0.001$ , in indicator of impact of climate (temperature range, topography, less availability of green fodder and the strain variation of the buffalo, although Nil Ravi. Our results are in agreement with the work done by Muhammad Khalil Bashir *et al.*, (2015) who analyzed data of 9300 buffaloes of various less of the Country over a period of 30 years. Our results are not in agreement with the age at first calving in Kundhi buffaloes of Sindh as found by Sajid Aziz Sammo *et al.*, (2012) as the first calvers age revealed 980 to 1030 days, quite earlier than Nili Ravi heifer. Our results are also not in agreements with the work done by Aziz MA *et al.*, (2001) from Egypt in Egyptian buffaloes where age at first calving is also between 970 to 1086 days in their study of genetic and phenotypic variation. The work of Ranjana sachan *et al.*, (2015) form India is also belated age at first service ata 1136 to

1153 days who carried out analysis of 120 dairy farms. While the work of Momer Khan *et al.*, (2014) showed a Puberbertaol age of  $1147.93 \pm 13.05$  day and 50% showed heat signs after that in Azikheli buffaloes and Pasha (2013).

Gestation period of our study in Okara in accordance with buffaloes specially Nili Ravi the Okara as first calvers was cumulative average as  $309.30 \pm 7.65$  days and as second calvers 309.94 days while buffaloes kept at Jhelum first calvers as  $309.66 \pm 7.53$  days while Jhelum Second calvers was  $310.33 \pm 7.99$  days in with in the range of various strains of this breed as put forward by Khalid Bashir (905-907 days when analyzed buffaloes of Inida as reported by Kamble Bishe and Chauhon (2014). The study evidence gestation period as with in range of buffaloes as reported by Muhammad Hafeez (2011), in the text book of Livestock Industry as well as M. Hafeez (2016) comparison of two buffalo economic units in Okara Darak Messy *et al.*, (2014) advocated stress factor affecting gestation period when extreme temperature discussed in Nili Ravi buffaloes and also in the range forwarded by Pasha (2013).

Forwarded by Pasha (2013).The milk yield as economic factor (Okara) the most important economic trait, being the milk yield per lactation (days) was  $2150.33 \pm 92.10$  liters in first calvers while as second calvers the cumulative production was  $2227 \pm 102.41$  liters (increased by 77.33 liters = 3.6%) in experimental buffaloes (N-50). The milk yield of buffaloes kept at Jhelum first calvers showed  $1861.00 \pm 49.60$  liters and  $2039.00 \pm 47.19$  liters evidenced an increase of 178 liters = 9.56% which is a positive economic factor in this study. The study is in agreement with the work done by three workers in Pakistan, One in Indian, One in Brazil and Egypt who studied an increasing trend of milk production in second calvers.

## CONCLUSIONS:

Based on two lactations,, two gestations period's milk recorded (milk produced, in liters), and duration of lactation of experimental buffaloes at Okara (N=50) and Jhelum (N-50) Government farms, over a period of two years 2015-16 and 2016-17, it is conveniently concluded that:-

1. Age at first Service of heifers was 1144 day, in Okara (N-50) and 1172 days in Jhelum experimental buffaloes (N-50) inclusive summer, and Mild season born.
2. The gestation period remained as cumulative averaged to 309 days at Okara (both First and Second calvers) while the gestation period of buffaloes kept at Jhelum (both first and second calvers) as 309.66 days inclusive winter, summer and mild season.
3. The milk yield in first calvers as well as second calvers cumulative averaged was 7.52 and 7.55 liters per day, with a better trend while in buffaloes kept at Jhelum produced 6.7 and 7.00 liters in first and second calvers and were within the range of overall buffaloes milk production.
4. The days of lactation (duration of milking days) was within the range of buffaloes, both at Okara as well as Jhelum Government Dairy Farms.
5. Inter Calving interval (in days) in Okara was in the range of 405 days while in Jhelum it was in the upper range of 439 days, which can be attributed to season Nutritional status and strain of Nili Ravi Buffaloes.
6. The milk yield which was comparatively better as seen in the contemporary studies of India, Botswana, Brazil and Egypt which still could be improved with better Nutritional and Managemental practices.
7. As there prevailed 100% animal health coverage (vaccination against endemic diseases, deworming yearly and spray against ectoparasites) no disease incidence was recorded.
8. No death amongst Experimental buffaloes both at Okara and Jhelum Govt Dairy Farms was recorded.
9. Simultaneously no abortion or still births were recorded during the period of this study of 2015-16 and 2016-17.
10. Some of the economic traits, as parameters, such as cost of milk production was not carried out which is still a complete study and may be carried out exclusively.

11. It is also concluded that maximum of the objectives of the study were achieved

#### **RECOMMENDATIONS:**

1. Research studies on economic traits in terms of Age at first lactation, is needed to be carried out on the Farm born heifers, at all Government farms.
2. Selection of experimental heifers as well as buffaloes must be from mother buffaloes with good genetic makeup.
3. The gestation period must be attributed to breed strain specific and experimental buffaloes be selected from the mothers pedigree tested both Bull mothers and high yielder mothers.
4. Randomized selection of experimental buffaloes as well as heifers are not discouraged but, lower producers must be subjected to replacement for more better results.
5. Nutritional aspects must be given immense attention specially for green fodder, in addition to grazing for still better results

#### **REFERENCES:**

- Aziz, M.A. S.J. Shoeman, G.F. Jordaan, El. Chafie and AT. Mahdy (2001). Genetic and Phenotypic variation of some Reproduction Traits in Egytian Buffalo. South African Journal of Animal Sciences, Vol-31 (03), pages 195-199.
- Bashir MK, MS Khan, SA Bhatti and A Iqbal (2007). Lifetime Performance of Nili-Ravi Buffaloes in Pakistan. Asian-Australasian Journal of Animal Sciences, 20: 661-668.
- Bilal M. Q.; M. Suleman and A Raziq (2006) Buffalo: Black gold of Pakistan. Livestock Research for Rural Development 18 (9).
- Darak Messy, Saeed Ahmed and M. Hafeez (2014). Stress factor in Livestock causing Economic Losses Pak.JLSc. Vol (VI), No.6 48, pages: 410-429.
- Kambel, SS. B.R.Bishe; and D.S Chauhan (2014). Impact of Climate parameters on milk production in murrach buffaloes. Journal of Crop weed, 10(2), pages: 71-76
- Kumar, S., Nagarajan, M., Sandhu, J. S., Kumar, N., Behl, V., and Nishanth, G. (2007). Mitochondrial DNA analyses of Indian water buffalo support a distinct genetic origin of river and swamp buffalo. Anim Genet 38, 227-32.



- Kuthu, Z. H., 2007. A study on seasonality of breeding and reproduction in Nili-Ravi buffaloes, indigenous (non-descript) and cross bred (Jersey x indigenous) cows in Muzaffarabad (Azad Jammu and Kashmir). MSc (Hons) Thesis, Allama Iqbal Open University Islamabad, Pakistan.
- Mansoor Ahmed, Muhammad Akram (2016-17). An update of livestock Sector: Recent status of Livestock population, production of Milk and Meat including Livestock by-products, in Pakistan.
- Momen Khan, Muhammad Saleem, Hmayun Khan, Ali Gohar, Saeed Ahmad, and Farmanullah (2014), Assessment of Morphometric, productive and reproductive characteristics of Azikheli buffalo in sawat valley in Northern Pakistan life Science Journal , 11(12s), pages: 01-08.
- Muhammad Hafeez (2011). New approaches in Feed management for Livestock Development: Guide lines for feeding high yielders. Livestock Industry: Livestock and Poultry production, HEC Publication pages 43-45.
- Muhammad Hafeez (2013). Improving status of Livestock sector with Government Interventions: The comparison of Facts. Pak.JLSc. Vol (v) No-05 pages: 247-255.
- Muhammad Hafeez (2016). Economic Comparison of two Dairy Units of rearing Buffalo Heiferis and First Calves for their Potentials over six years Pak J.L.Sc Vol-VIII No-08 -67,pages: 594-507.
- Muhammad Khalid Bashir, Muhammad Iqbal Mustafa, Muhammad Lateef, Pervez Akhtar, Muhammad Farooq Khalid , Shahidur Rehman and Umar Farooq (2015). Reproductive performance of Nili Buffaloes kept under Farm conditions in Pakistan Pak J.Life Social Sci, Vol-13 (2), pages 104-109.
- Pasha, Talat Naseer (2013). Propect of Nutrition and feeding for sustainable buffalo production Buffalo Balletin, Vol-32 (special issue) 01, pages: 91-110.
- Warriach, H. M., A. A. Channa, and N. Ahmad ( 2008). Effect of oestrus synchronization methods on oestrus behaviour, timing of ovulation and pregnancy rate during the breeding and low breeding season, in Nili- Ravi buffaloes. Anim. Reprod. Sci. 107, 62-67.
- Wasti Ejaz (2015-16) Livestock, Agriculture Sector of Pakistan. Data on Livestock population Production of milk and meat including by products economic advertising M/O Finance Pak Economic Survey Reports GoP, Islamabad.
- Wasti Ejaz (2016-17) Livestock, Agriculture Sector of Pakistan. Data on Livestock population Production of milk and meat including by products economic advertising M/O Finance Pak Economic Survey Reports GoP Islamabad.
- Zarate, A.V. 1996. Breeding strategies for marginal regions in the tropics and subtropics.



## THE PREVALENCE OF EQUINE DISEASES IN OKARA AND ITS SURROUNDING AREA

Ashfaq Ahmad<sup>1</sup>, M. Tariq Tunio<sup>2</sup> and Muhammad Hafeez<sup>3</sup>

### ABSTRACT

This study pertains to the investigative approach of the evidence of Equine diseases in (i) Okara and its surroundings areas namely (ii) Coloyana stud farm, (iii) Renala, (iv) Shah-bore, (v) Okara stud farm, (vi) Coloyana Single (vii) Depalpur, Pipli Pahar and (viii) Qadir Abad. The total population investigated was 1132 equines comprising (a) 714 adults (664 Mares and 50 Stallions) and (b) 418 young stock (115 mares, 141 horse foals, (H/FI) and 162 horse Fillies (H/Fillies). The study period was 18 months during 2015-16 and 2016-17. The study was splitted in the parameters of (a) Bacterial diseases, (b) Clinical diseases syndrome, (c) Metabolic disease/syndrome and (d) Surgical disease syndromes. Under the Bacterial diseases 34 cases of Endometritis in adult mares (6.028%) with an overall percentage of incidence of 4.41%, 32 cases of Strangles in young stock (7.65%) with an overall incidence of 2.82%, three cases of diarrhea (0.26%), two cases of Enteritis (0.17%) while only one case of Tetanus (0.08%) were recorded. Under the Surgical diseases 27 cases of wounds/lacerations out of total of 1132 (2.38%) were recorded, out of which 11 cases pertained to adults (1.54%) while 16 cases were out of 418 young stock (3.83%). Simultaneously 07 cases of Canker out of adults (1.05%) and only one case of Thrush out of adults, in Okara, (0.14%) with 03 cases of limb fractures (03 in adults (0.28%) and one in young stock (0.24%) were recorded. Since these three cases were not curable, hence were destroyed. No death due to Surra was recorded while deaths due to Colic were 36, abortion cases in Mares (postparturient endometritis), one case each of Tetanus, two fracture cases, one Thrush, one general debility and one paralysis case was not an alarming situation but Colic incidence in 18 months at different areas of our study, needed careful attention and vigilance of Veterinary Officers, the farmers and the only NGO working on Equine health, the Brooke Hospitals International, Pakistan. The data of individual diseases, as parameters, were subjected to Analysis of Variance (ANOVA), where applicable, in Enteritis (ENT), Heat stress (HTRS), Heat Stroke (HTRK) and Surgical Wounds (SW), as well as Ordinary Least Square (OLS) methods were used and significance was worked out to probability level of  $P < 0.01$ , using Duncan's "T" Test. It is suggested that (i) the registration number of equine breeder farmers be increased and (ii) equine farmers must be provided with short trainings on animal health and production of one week to 10 days, so that they become aware of equine and other diseases. (iii) Further studies also needed to be carried out, on these lines, in other parts of the Country, as well.

**Key Words:** Equine Diseases, Okara and its Surrounding areas.

Article received: September-2018

Accepted: November-2018

Published: December-2018

### INTRODUCTION:

The livestock sector of Pakistan always highlights population, and production of cattle, buffaloes, sheep and goats but relatively less projection has been received to equines, in the country. Undoubtedly equines comprising horses (stallions, studs, mares, foals/filly), mules and donkeys are less in number in the

<sup>1</sup>Ex-Gradu Student, M.Sc.(Hons), L.M. Department of Agriculture Sciences, AIOU, Islamabad.

<sup>2</sup> Assistant Professor, L.M. Department of Agriculture Sciences, AIOU, Islamabad.

<sup>3</sup>President LDF, Islamabad.

country as 1.4 millions (estimated) as of 2014-15 Livestock Population and Production data (Ejaz Wasti-2014-15) of (i) Pak. Economic Survey, as well as the Reports of Government of Pakistan (GOP) (ii) The Ministry of Food Securities and Research, Livestock Wing (GOP) and (iii) The five Directorates of Livestock and Dairy Development Department (L&DDs) Punjab, Sindh, Balochistan, Khyber P.K and AJK.

The importance of equines is understood and is being documented since centuries old, as may be 3000 to 5000 years B.C. as recorded in Anthropology and History books and in Al-Quraan. Equines had been used for travelling, horse-riding, used in wars and transporting goods and weapons of Armed forces in filly and mountaineous areas, in the country and abroad (Literature on equines and horses, as well as work of researchers reviewed will reveal the facts).

Little work is evidenced on equine diseases, in developing while more information is recorded in developed countries, on diseases of horses, mules and asses including Zebras and Zoo animals. Clinical aspect of most of the diseases of (i) Digestive System (Diarrhea, Colic, Gastro-enteritis, gastric ulcers and Tympanitis etc) have been documented by Iftikhar (2013) in Pakistan, Nataniel and Jean Allen Shehan in USA (2008), Chris Sanchez (2012) in USA, and Muhammad Mashayekhi and Behnam Ashtarj (2013) in Iran. Respiratory diseases including strangles reported by Lindon Reile and Roger (1983) in USA, Tremanie and Dixon (2001) from England, who also reviewed previous record of eighties and nintees. Cases of skin affections and external parasites have also been documented at home and abroad as well as surgical affections, (fractures, abrasions, lacerations, wounds and other cases of Foot Canker and/or Exostosis and Mange/Eczemas have been reported and recorded, as reviewed.

Our study area is regarded as “Mare and horse Breeding Areas” of the Remount Veterinary and Farms Core (RVFC) where one female (mare) is handed over to registered farmer (cattle and equine farmer) who in turn provides two foals/filly foals to Horse Breeding Center, Okara. A total of 675 squares of land where almost 291 farmers are registered, with this project, spread on 150-160 Squires of lands (Murabbas). One Square land, irrigated/agricultural area of 25

acres or upto 200 kanals (registered with Horse/Mare Breeding System) is prevalent since 1921-22.

Our study area was spread over equine breeding areas namely (i) Okara, (ii) Coloyana Stud Farm (CSF), (iii) Renala (iv) Shahbore, (v) Okara Stud Farm (OSF) and (vi) Coloyan Single (CS) while the diseases looked for were (a) Bacterial (b) Clinical diseases/affections (c) parasitic diseases as documented by Barsissa Kumsa et.al (2012) and (d) metabolic diseases and (e) Surgical diseases.

### RESEARCH METHODOLOGY:

The study remained limited to Okara district and surrounding areas in equine population of Adult Horses, mares, mules, young stock (foals and fillies), kept with the 291 registered farmers, out of which mostly registered farmers maintained 3-4 animals, on an average with RVFC stud farm. These 714 adults and 418 young stock equines taken as population, spread over 30-40 km radius, and investigated for disease prevalence as per methodology of disease investigation by Claudia Keber et.al (2009) while surgical disease specially wounds and fractures by Gadullah Ekeley et.al (2014)

The disease prevalence data collected from three following sources (i), (ii) and (iii) and (iv) with personal observation as under:

Registered farmer's record.

- (i) Civil Vety: Hospitals/Veterinary Dispensaries and UC Vety: Centres records.
- (ii) Brook Hospital Internationals Record in Okara and surroungs area.
- (iii) Personal observations.

Categorized in three groups as under:

- A Adult Horse (Males) Mare stallow 714
- B Young Stock - Foals (Males 418  
and Females (fillies)
- C Mares (who have given birth Included)

The data was collected in the following categories of diseases:

- (a) Clinical diseases
- (c) Parasitic Diseases

- (b) Bacterial Diseases
- (d) Metabolic Diseases
- (e) Surgical Diseases

As per methodology narrated by Guillaume Salle and Jaques Cabert (2015)

## RESULTS AND DISCUSSION:

The findings of our investigative studies are detailed below:-

### A- The equine Population of the study area:-

The adult Equines recorded were (a) Mares-664 plus 50 studs=714 (b) Young stock=418 and stallions 57. The mare population split comprised Okara=48, Coloyana=256, Renala 168, shahbore=109, Okara stud=15 and Coloyana Single=68.

### B- The young stock namely i) Fools/Fillies, (ii) Horse colt (H/Clt) (iii) Horse Filly (H/Fly) and (iv) Mules were recorded as 115,141 and 162 respectively as presented in table No-01, table No-04, table No-05 and table No-09 respectively.

### C- Prevalence of Bacterial diseases in the study area of equines:-

The cumulative picture of all the study area namely (i) Okara (ii) Coloyana stud farm, (iii) Ranala, (iv) Shahbore, (v) Okara stud farm (vi) Coloyana Single, (vii) Dipal pur (Pipli pahar) and (viii) 50/3-R was involved and these diseases categorized were Endometritis =34, Catarrhal infection=50, Tetanus 01, Diarrhea=03, and enteritis=02 were recorded in Mare population.

#### The Catarrhal infection was recorded in

H/Filly=01 case. Both the Endometritis=34 and catarrhal infection 60 cases were treated and cured as table No-02. Endometritis was record in Adults (Mares only=34 cases out of 664 with percentage of 6.028%. Tetanus was clinically recorded in four adults (0.56%) and one young stock (0.24%) treatment efforts were done only one cured while four died. Diarrhea was recorded in Three Mares adults (0.45%) were treated and cured.

Pneumonia was recorded in two young stock (0.478%) both cases were treated and cured. Enteritis was observed in 05 adults (0.7%) and 04 young stock (0.95%). Treatment efforts were made and 08 cases were cured, as appears in table No-02. Strangle was recorded in 32 young stock out of a total population of 418 with a prevalence rate of 7.65% in the study area with an overall incidence of 2.83%.

#### **D. Prevalence of clinical disease syndrome:**

The following clinical disease syndrome were recorded, over a period of one and half years (2015-16):

- (i) **Colic** was recorded in 61 adult equines (9.17%) while 19 young stock showed the prevalence of colic (4.53%) in our study area.
- (ii) **Abortion** were recorded in 17 adult mares only, throughout our study period (2.56%), in a total population of 664 mares.
- (iii) **Hyperthermia** was recorded in 18 adults (3.14%) while 07 young stock also showed Hyperthermia (2.86%).
- (iv) **General Debility** was observed and recorded in 05 adult equines (0.7%) only and young stock did not show any such syndrome.
- (v) **Heat stroke** was recorded in 11 adults (1.54%) while 12 young stock showed heat stroke (2.87%), as per available record.
- (vi) **Paralysis** two cases were recorded, one each in mares (0.15%) and mules (0.6%), as appear in table No-03.

#### **E. Prevalence of Parasitic diseases:**

In the broad areas of equine population of (i) Okara, (ii) Coloyana (iii) Renala and (iv) Shahbore, minimum parameters of (a) Tick infestation, (b) Mange mites, (c) Surra (Trypanosomiasis) and (d) Internal parasites were targeted, in both Adults and young stock of our study area.

- (i) **Tick infestation:** A total of 09 cases (1.26%), 04 in Okara, 03 in Renala and 02 in Shahbore were recorded with immediate treatment and removal of ticks, cured the infestation.

(ii) **Mange Mites:** Within the study period of 18 months (2015-16) only three mange mite case were recorded (0.42%), were treated and cured.

(iii) **Surra (Trypanosomiasis):** Seven cases (Blood Diagnosed), out of mare population of 664 were recorded (1.05%) and with proper treatment these were cured. No death, due to Surra was recorded.

(iv) **Internal parasites:** Two cases of internal parasites (Faccal test based) were recorded in the Mare population (0.28%) with the recommended anthelmintic treatment the internal parasites were test negative in our study area. The prevalence of parasitic disease picture is displayed in table No-07.

#### **F. Prevalence of Metabolic Diseases**

As per our targeted parameter, metabolic diseases searched were (a) Lameness, (b) Gen Debility, (c) Hyper Thermia and Heat Stroke along with (d) Arthritis as per our observations and the available record.

16 cases of Lameness in adult equines (2.24%) were recorded in Coloyana area. Ten cases of Gen Debility out of adult equines (1.4%) in coloyana area were recorded. Hyperthermia and Heat stroke: A total of 18 cases of Hyperthermia and Heat stroke, out of Adult equines(2.52%) in the coloyana area were recorded. In Renala area a total of 30 cases (one in adults and 29 out of young stock (6.94%) as well as cases of Hyperthermia and Heat stroke were also recorded. Simultaneously 04 cases out of young stock (0.96%) were also recorded in Shah bore area of our study. The results of metabolic diseases have been detailed in table No-07.

#### **G. Prevalence of Surgical Disease Syndromes.**

In all the four localities of (i) Okara, (ii) Coloyana, (iii) Renola and (iv) Shah bore, the targeted surgical disease syndromes namely (a) Wounds, (b) Canker, (e) thrush and (d) fractures were investigated.

(i) **Wounds (Accidental)** A total of 27 wounds cases out of the total population of equines of (1132) were observed and recorded (2.38%). Out of this number of wounded (Accidental) 11 cases

pertained to Adult equines (714) (1.54%) while in the young stock wounded were 16 out of 418 (3.83%) respectively.

- (ii) **Canker (Foot Canker)** Only 07 cases of canker out of Adult population (1.05%) were recorded (02 from Okara and 05 from Coloyana area) while the equine population of Renala and Shahbore did Not show this foot disease.
- (iii) **Thrush** Only one case, out of adults, in okara area was found (0.14%) and this being a disqualification disease as well as non-curable, the victim was destroyed, as per record.
- (iv) **Accidental Fractures** As per our parameters we were looked for fracture cases, both in Adults and young stock. Those admitted in the clinics were only 03 cases (2 in adults (0.28%) and one in young stock (0.24%). All the three cases, being not curable were destroyed as per record. The detail is available in table No-08.

**(h) Animal Health status of Equines in the study area was as under:**

- (i) Prophylactive Vaccination against endemic diseases, an over all 100% vaccination was carried out against (i) Anthrax, with Anthrax Spore Vaccine (ASV),
- (ii) Mallein Test against Glanders (on Annual basis),
- (iii) Annual De-worming with anthelmentic of choice.
- (iv) Spray of ectoparasitocides, hence the status of health was declared satisfactory during the period this our study 2015-16 and 2016-17.

**Table-No-01; Showing the strength of Equine in the project area of the study (2016-2017).**

| Sr. #            | Study Area Equine Farm  | ADULTS (A) |          |           | Young Stock (B) |            |            |            | Total       |
|------------------|-------------------------|------------|----------|-----------|-----------------|------------|------------|------------|-------------|
|                  |                         | Mares      | H/C      | H/S       | Mules           | H/C        | H/F        | Mules      |             |
| 01               | Okara                   | 40         | -        | 01        | -               | 09         | 05         | 15         | 70          |
| 02               | Coloyana Stud Farm      | 256        | -        | 05        | 05              | 21         | 20         | 75         | 377         |
| 03               | Renala                  | 168        | -        | 05        | -               | 62         | 75         | 30         | 340         |
| 04               | Shahbore                | 109        | -        | 03        | -               | 16         | 23         | 29         | 180         |
| 05               | Okara Stud Farm         | 15         | -        | 10        | -               | -          | 01         | 04         | 20          |
| 06               | Coloyana Single         | 68         | -        | 10        | -               | 07         | 18         | 09         | 112         |
| 07               | Pipli Pahoor Qadir Abad | -          | -        | 14        | -               | -          | -          | -          | 14          |
| <b>Sub Total</b> |                         | <b>664</b> | <b>-</b> | <b>50</b> | <b>-</b>        | <b>115</b> | <b>141</b> | <b>162</b> | <b>1132</b> |
| <b>Total</b>     |                         | <b>664</b> | <b>-</b> | <b>50</b> | <b>-</b>        |            |            | <b>418</b> | <b>1132</b> |

Source: GT-RVFC-Mare Production Program in Okara and Sounding 2016-17



**Table-No-02: Showing the Prevalence of Bacterial Diseases in the Equine Population of Okara and Surrounding areas.**

| Sr. #        | Diseases  | ADULTS    |            |           |           | Young Stock |           |           | Health Care | Sequale    | Death     |
|--------------|-----------|-----------|------------|-----------|-----------|-------------|-----------|-----------|-------------|------------|-----------|
|              |           | Mares     | H/C        | H/S       | Mules     | H/C         | H/F       | Mules     | Treated     | Cured      |           |
| 01           | Endometri | 34        | -          |           | -         | -           | -         |           | 34          | 34         | -         |
| 02           | Catarrh   | 50        | 04         | 04        | -         | 02          | 01        |           | 61          | 61         | -         |
| 03           | Tetanus   | 01        | 02         | 01        | -         | -           | -         |           | 04          | 01         | 03        |
| 04           | Diarrhea  | 03        | -          | -         | -         | -           | -         |           | 03          | 03         | -         |
| 05           | Pneumonia | -         | -          | -         | -         | -           | -         | 01        | 01          | 02         | -         |
| 06           | Entritis  | 02        | 01         | -         | 02        | 03          | 01        |           | 09          | 08         | -         |
| 07           | Strangles | -         | 20         | 08        | 04        | -           | -         | -         | 32          | 29         | 03        |
| <b>Total</b> |           | <b>90</b> | <b>207</b> | <b>13</b> | <b>06</b> | <b>05</b>   | <b>02</b> | <b>01</b> | <b>144</b>  | <b>138</b> | <b>06</b> |

Source-OPD-Register Data of Vety Officers, Thesis Research Data of Ashfaq Ahmed MSc(Hons), LM-2017

**Table-No-03 Showing the prevalence of Clinical Diseases Syndrome in Equine Population of Okara and Surrounding area (2015-16).**

| Sr.# | Kind of Diseases          | ADULTS |     |     |       | Total | Young Stock |     |        | Total | Percent |
|------|---------------------------|--------|-----|-----|-------|-------|-------------|-----|--------|-------|---------|
|      |                           | Mare   | H/C | H/S | Mules |       | H/C         | H/F | Mul es | Adult | Young   |
| 01   | Colic                     | 51     | 01  | 03  | 06    | 61    | 04          | 03  | 01     | 9.17  | 4.53    |
| 02   | Abortions                 | 17     | -   | -   | -     | 17    | -           | -   | -      | 2.53  | -       |
| 03   | Hyperthr                  | 15     | 02  | 01  | -     | 18    | 02          | 01  | -      | 3.14  | 2.86    |
| 04   | Heat Stroke               | 06     | 02  | 02  | 01    | 11    | 03          | 03  | 01     | 3.14  | 2.86    |
| 05   | Born Dead/<br>Still Birth | 10     | -   | -   | -     | 10    | -           | -   | -      | 1.5   | -       |
| 06   | Gen. Debility             | 02     | 02  | 1   | -     | 05    | -           | -   | -      | 0.75  | -       |
| 07   | Paralysis                 | 01     | -   | -   | 01    | 02    | -           | -   | -      | 0.30  | -       |

Source-OPD-Register Data of Vety. Officers, Thesis Research Data of Ashfaq Ahmed MSc (Hons), LM-2017.

**Table-No-04: Showing total Equine Population of Adults in the study area of Okara and surroundings (2016-17).**

| Sr.#         | Area      | Mare       | H/C       | HF         | Mules     | Total      |
|--------------|-----------|------------|-----------|------------|-----------|------------|
| 01           | Okara     | 48         | 01        | 02         | 02        | 53         |
| 02           | Renala    | 168        | 62        | 75         | 30        | 335        |
| 03           | Coloyana  | 66         | 07        | 18         | 08        | 99         |
| 04           | Shah bore | 108        | 16        | 23         | 30        | 177        |
| <b>Total</b> |           | <b>390</b> | <b>86</b> | <b>118</b> | <b>70</b> | <b>664</b> |

Source: Stock Register of Veterinary Officers of the study area (2016-17), Result data sheet of Ashfaq Ahmed MSc (Hons) LM, AIOU.



**Table-No-05; Showing the Equine Population Young Stock in the study area of Okara and Surroundings (2016-17).**

| Sr.#         | Area/Farm             | H/FI       | H/FIly     | Mules      | Total      |
|--------------|-----------------------|------------|------------|------------|------------|
| 01           | Coloyana Single       | 07         | 18         | 09         | 34         |
| 02           | Coloyana Stud Farm    | 21         | 20         | 75         | 116        |
| 03           | Okara                 | 09         | 05         | 15         | 29         |
| 04           | Renala                | 62         | 75         | 30         | 167        |
| 05           | Shahbore              | 16         | 23         | 28         | 67         |
| 06           | Okara(Stud Farm)      | -          | 01         | 04         | 05         |
| 07           | Dipal pur Pipli Pahar | -          | -          | -          | -          |
| <b>Total</b> |                       | <b>115</b> | <b>142</b> | <b>161</b> | <b>418</b> |

Source: Stock Register of Veterinary Officers of the study area (2016-17), Result data sheet of Ashfaq Ahmed MSc (Hons) LM, AIOU 2017.

**Table-No-06 Showing the Horse Stallion (H/St) and Donkey Stallion (D/St) distribution in the study area.**

| Sr.#                | Area Farm              | Horse Stallion (H/St) | Donkey Stallion (D/ST) |
|---------------------|------------------------|-----------------------|------------------------|
| 01                  | Okara                  | 01                    | 02                     |
| 02                  | Coloyana               | 05                    | 05                     |
| 03                  | Renala                 | 05                    | 05                     |
| 04                  | Shah bore              | 03                    | 04                     |
|                     | Total Farm             | 14                    | 16                     |
| 05                  | Singal                 | 10                    | 08                     |
| 06                  | Depar Pur Pipli Pahoor | 02                    | 02                     |
| 07                  | 50/3R                  | 02                    | 03                     |
| <b>Total Stable</b> |                        | <b>14</b>             | <b>13</b>              |

Source: Vety: Officers Stock Register (2015-16), Thesis Research data of Ashfaq Ahmad 2017, M.Sc (Hons)LM, AIOU-2017.

## DISCUSSION:

Equine population was and is not very large in the country, being 1.4 millions (estimated -2015-16), the data on equine diseases was rare and scanty. Our findings of Horse and Mare rearing area of Okara, Coloyana, Renala, Shah bore, Okara stud farm and Coloyana Single including Dipal pur and Qadirabad, out of a total Equines of numbering 1032 (with 714 adults and 418 young stock) within a radius of 35-40 Km indicated the farmer's interest in equine rearing and record was well documented. The prevalence of Bacterial disease namely Endometritis =34 out of 664 Mares(5.12%) of the area, indicated that breeding of horse population was a continuous process, in the study area but un-hygienic handling post-parturition, resulted in Endometritis. With immediate treatment of 100% cases these were cured, result of 31(91.17%), was again a quick response of area

Veterinary Officers. Our results are in agreements with the work done by Maischerger *et al* (2008) who reported persistent cases of post parturient endometritis and they have regarded it as the third most common vetro-medical condition in Ireland, England and other European Surroundings. As also found by other workers. Our findings on the prevalence of Catarrhal infection (a total of 61 cases were recorded 58 out of 664 adults (8.73%) while 03 cases out of 418 young stock (0.72%) showed this disease as endemic, in the study area. Diarrhea was recorded in only 03 Adults (Mares) and one young stock which can easily be designated as occasional incidence, but was investigated as based on dietetic errors, as reported in Pakistan and elsewhere. Tetanus was clinically diagnosed in four adults (0.56%) and one young stock (0.24%) indicative of Tetanus being endemic in equines, the treatment effort cured only one while four died. The treatment regimen included Anit-tetanus toxoid Serum (ATTS) but it is only effective quite ahead of time. Our findings are quite in Agreement with the diagnostic work of Tetanus cases in Orton *et.al.* (1985) who carried out treatments but the fatality was 75% and related it with pre-history of being wounded with an average of 09 days, before the onset of symptoms, our results also agree with the work done by Stevson (2005) and other workers.

Entritis, as was recorded in 05 adults and 04 young stock was indicative of incidence of this disease (which responded to antibiotics, as per record of OPD Register) Equines need proper animal health care and farmers were advised to get their equine checked by the area Veterinary Officer. Our investigation are quite in agreement with work done in Pakistan by Iftikhar (2012) and from other countries USDA (1998). Nutritional Aspects, as we did not work on needs conserted attention (Anonimous-2011), for disease control.

## CONCLUSIONS:

- 01 We had been able to identify Equine population of 714 Adult (mares, horse stallion, Horse Colt and Mules) and 418 young stock (Horse/Mares, Horse Fillies, Horse Foals and mules) in Okara, Coloyana, Renala and Shah bore area for investigation.
- 02 Bacterial diseases namely Endometritis (in Mares), Catarrhal infection, Diarrhea, Tetanus, Pneumonia Strangles (in young stock) as well as

Enteritis was recorded in the study area. Three deaths due to Tetanus were recorded.

- 03 In the clinical disease Colic, Abortions(in Mares), Hyperthermia, Heat stroke, General debility and paralysis were recorded, during the study period of 2015-16.
- 04 Under the parasitic diseases, tick infestation, mange mites and Surra (Trypanosomiasis) including internal parasites, were observed and recorded.
- 05 No death was recorded due to Surra, in our study area.
- 06 Looking for Surgical disease syndrome, cases of wounds/lacerations, Canker, Thrush and Fractures were recorded.
- 07 As evident 100% acaricidal spray for ecto parasites, six monthly, in young stock and annually in adults, had been in practice but still picked-up ecto-parasites were observed and recorded.
- 08 All young stock and Adults had been subjected to Annual Propylactive vaccination against Anthrax (with Anthrax Spore Vaccine), no case of Anthrax was observed, not recorded.
- 09 The record of all Veterinary Officers was nicely maintained.
- 10 Horse's Registered Breeders needed short training courses on animal health care, specially equine health, for better awareness.

#### **RECOMMENDATIONS:**

1. Animal Health care activities needs be strengthened in Okara, Coloyana, Renala, Shah bore, Dipal pur, Qadir abad and other nearby villages.
2. Horse and Mare Breeding and Rearing Farmers may be increased for Registration who have Agricultural land for grazing, proper sheds available and drinking water facilities.
3. Weekly Visits of Veterinary Officers concerned, in all the Registered Farmers (170-178), should be increased to twice a week, for better interaction and quick response to equines, sick/diseased, for better results.

4. Laboratory diagnosis facilities be extended to Equine Breeder Farmers to encourage them for keeping more number of equines, with some additional Financial assistance, as encouragement.
5. Animal Nutritional Aspects must be taken into consideration so that small clinical syndromes like diarrhea, enteritis and general debility must be reduced to nil, with special attention to Colic.
6. Farmers need short training in Animal Health and Production (of a Week to 10 days), in a gathering of 20-25 candidates. This will be a step further for improvements and will create awareness of diseases and treatment in equines and other domestic animals.

#### REFERENCES:

- Anonimous (2011). Horse Nutrition: Nutritional Requirements of Horses: National Academy of Sciences National Academy Press, Washington D.C. Merk Vety. Manual; pages 04-033.
- Bersissa Kumsa, Habtamu Tamrat, Getachew Tadesse, Nigutu Aklilu and Rudi Cassini (2012). Prevalence and species composition of Ixodid ticks infesting horses in three agro-ecologies in central Oromia, Ethiopia Trop Animal Health Prod: 44: pages 119-124.
- Claudia E. Kerber; Marcedo B. Labruna, Feraando Ferreira; Daniel T. Dewaal; Donald P. Knowles and Solange M. Gennari (2009). Prevalence of Equine Piroplasmiasis and its association with tick infestation in the state of Sao Paulo, Brazil. Rev. bras. Parasitol Vety. Jaboticabal V.18 n 4 pages 1-4.
- Gadallah. S. M. Elkeley, M.S Amer and A.A. Shamaa (2014). Equine Limbs fracture: The incidence and management. Minufia Veterinary Journal Vol – 8(1): pages 241-261.
- Guillaume Salle and Jaques Cabret (2015). A Survey on parasite management by equine Veterinarians, high-lights: the need for regulation change. Vet. Research Open. 2 (2), e.000104, pages 01-11.
- Iftikhar M. (2012), Equine Diseases prevalent in Azad Jammu and Kashmir. M.Sc.(Hon) Livestock Management Thesis, Department of Agriculture Sciences, AIOU, Islamabad.
- Lindon J. Reile and Roger M. Genetzki (1983). Equine strangles: A brief overview Iowa state University Veterinarian Vol-45-Iss-1, pages 16-19.
- Maischberger, E., JA Irwin, SD Carrington and VE Duggan (2008). Equine Post breeding Endometritis: A review. Ir. Vet J 6(03), pages 163-168.
- Mohammad Mashayekhi and Behnam Ashtarj (2013). Study of *Gastrophilus* role in equine gastric Ulcer syndrome, in Tabriz area. Bulletin of environment, pharmacology and life science Vol-2 [12] November 2013, pages 169-172.

- Nathaaniel A white and jean Ellen Shohan (2008). Colic: Prevalence, Risk factors and Prevention USDA-APHIS, Veterinary services, centre for epidemiology and Animal health-US.
- Orton, R.K., Hume, LD., & Leng, R.A. (1985). Effects of exercise and level of dietary protein on digestive functions in horses. *Equine Veterinary Journal*, 17, 386-390.
- Stevenson, M. (2005). *An Introduction to Veterinary Epidemiology*. Palmerston North; Massey University, Private Bag.
- Tremaine W.H. and P.M. Dixon (2001). A long term study of 277 cases of equine Sino-nasal disease. Part-I: Detail of horses, historical and ancillary diagnostic findings. *Equine Veterinary Journal* 33(3) pages 274-282.
- United States Department of Agriculture. (1998). Info. Sheet Veterinary Services. Retrieved on November 13, 2011, from [http://www.aphis.usda.gov/animalhealth/nahrms/equine/download/equine Morbidity.pfd](http://www.aphis.usda.gov/animalhealth/nahrms/equine/download/equine%20Morbidity.pfd).
- Ejaz Wasti (2015-16), Pak. Economic Survey, Ministry of Finance, GoP, Islamabad.
- Ejaz Wasti (2016-17), Pak. Economic Survey, Ministry of Finance, GoP, Islamabad.

## **RECENT UPDATE OF LIVESTOCK SECTOR OF PAKISTAN**

Mansoor Ahmed Khan<sup>1</sup> and Muhammad Hafeez<sup>2</sup>

### **ABSTRACT**

This Research cum status article describes the livestock, an important sub - sector of agriculture with its role is crucial towards rural and socio-economic development. Nearly 8 million families remain involved in livestock raising, deriving more than 35% income from livestock production activities and central to the livelihood of the rural poor in the country. It is a source of cash income, providing a vital and often the only source of income for the rural and most marginal people, playing important role in poverty alleviation drives, and foreign exchange earnings for the country. It contributed approximately 58.6 percent to the agriculture value added and 11.6 percent to the national GDP during 2015-16 as compared to 56.4 percent and 11.7 percent during the same period, the previous respectively. Gross value addition of livestock at constant cost factor of 2005-06 was increased from Rs. 1247 billions in 2014-15 to Rs. 1292 billions in 2015-16, showing an increase of 3.6 % as compared to previous year.

**Key Words:** Livestock Population Production and by-products Pakistan.

Article received: August-2018      Accepted: October-2018      Published: December-2018

### **INTRODUCTION:**

The population growth, increases in per capita income and export opportunities are fueling the demand of livestock and livestock products in the country. The overall livestock development strategy revolves to foster "private sector-led development with public sector providing enabling environment through policy interventions". The regulatory measures are aimed at improving per unit animal productivity by improving health coverage, management practices, animal breeding practices, artificial insemination services, use of balanced ration for animal feeding, and controlling livestock diseases of trade and economic importance. The objective is to exploit the livestock sector and its potential for economic growth, food security and rural socioeconomic uplift.

Poultry sector, one of the vibrant segments of livestock sector in Pakistan, provide employment (direct /indirect) to over 1.5 million people . The current investment in Poultry Industry was more than Rs. 700.00 billion. Poultry has been a balancing force to keep check on the prices of mutton and beef but also serving as backbone of agriculture sector, as it consumed over 7 million metric tons of agro residues. Poultry meat contributed 31% of the total meat production in the country. The commercial layer, breeders and broiler stocks showed

---

<sup>1</sup>Livestock Wing, M/o Food Securities and Research, GOP, Islamabad.

<sup>2</sup>Ex-Consultant/Assistant, Professor, LM.DAS, AIOU, Islamabad.

estimated growth of 7.0 %, 5.0% and 10% respectively while rural poultry developed @ 1.5 % when compared to the year 2015-16 (Wasti Ejaz 2016-17).

Pakistan recently proposed budget amounting to total investment of US\$ 450 Million. Under new deal and to the year 2020 strategy arrangements, Engro food will go for higher milk quality, variety of milk packages and products and farmers capacity building leading to reduction in poverty. This has given positive signal; and more investments in dairy sector are expected during the coming years. Moreover, to attract further investment in dairy sector, projects the small dairy farmers and the corporate dairy sector, beside discouraging import and to mitigate use of synthetic milk and recipe products, regulatory duties to the tune of 45% have been imposed on import of Skimmed Milk Powder (SMP) and Whey Powder (WP).

The Future Plans will continue to focus on (i) Inter – Provincial Coordination for development of livestock sector, (ii) Coordination with private sector to promote value addition in livestock industry and diversification of livestock products, (iii) Control of Trans-boundary Animal Diseases (FMD, PPR, Zoonotic diseases) of trade and economic importance through provincial participation, (iv) Bringing more investments in livestock sector and (v) Exploring new markets for export of meat and dairy products, with focus on Global Halal Food Trade Market(s).

**Table No.1 showing the Estimated Livestock Population (Million No) of Pakistan**

| Sr.# | Species | 2014-15 <sup>1</sup> | 2015-16 <sup>1</sup> | 2016-17 <sup>1</sup> | GR % |
|------|---------|----------------------|----------------------|----------------------|------|
| 01   | Cattle  | 41.2                 | 42.8                 | 44.4                 | 3.77 |
| 02   | Buffalo | 35.6                 | 36.6                 | 37.7                 | 2.97 |
| 03   | Sheep   | 29.4                 | 29.8                 | 30.1                 | 1.18 |
| 04   | Goat    | 68.4                 | 70.3                 | 72.2                 | 2.71 |
| 05   | Camels  | 1.0                  | 1.0                  | 1.1                  | 1.30 |
| 06   | Horses  | 0.4                  | 0.4                  | 0.4                  | 0.58 |
| 07   | Asses   | 5.0                  | 5.1                  | 5.2                  | 1.85 |
| 08   | Mules   | 0.2                  | 0.2                  | 0.2                  | 1.76 |

Source: Livestock Wing, M/O Food Securities and Research GOP, Islamabad

**Table No.2 showing Livestock and Poultry Production, at National and Provinces for 2014-15, 2015-16 and 2016-17.**

|                          | Units    | 2014-15 | 2015-16 | 2016-17 |
|--------------------------|----------|---------|---------|---------|
| <b>Pakistan</b>          |          |         |         |         |
| Cattle                   | 000 No's | 41,239  | 42,793  | 44,406  |
| Buffalo                  | ..       | 35,853  | 36,987  | 38,163  |
| Sheep                    | ..       | 29833   | 30,279  | 30,740  |
| Goat                     | ..       | 69,115  | 71,155  | 73,271  |
| Camels                   | ..       | 1,042   | 1,058   | 1,075   |
| Horses                   | ..       | 373     | 376     | 380     |
| Asses                    | ..       | 5,119   | 5,232   | 5,349   |
| Mules                    | ..       | 186     | 190     | 194     |
| Cocks & Hens             | ..       | 92,741  | 95,268  | 97,870  |
| Ducks Drakes & Ducklings | ..       | 595     | 589     | 584     |
| <b>KPK</b>               |          |         |         |         |
| Cattle                   | 000 No's | 9,206   | 9,637   | 10,084  |
| Buffalo                  | ..       | 2,952   | 3,089   | 3,230,  |
| Sheep                    | ..       | 3,951   | 4,029   | 4,111   |
| Goat                     | ..       | 13,184  | 13,661  | 14,156  |
| Camels                   | ..       | 63      | 63,121  | 63      |
| Horses                   | ..       | 116     | 591     | 127     |
| Asses                    | ..       | 588     | 121     | 595     |
| Mules                    | ..       | 75      | 76      | 77      |
| Cocks & Hens             | ..       | 33,379  | 34,108  | 34,853  |
| Ducks Drakes & Ducklings | ..       | 260     | 256     | 270     |
| <b>Punjab</b>            |          |         |         |         |
| Cattle                   | 000 No's | 20,895  | 21,757  | 22,652  |
| Buffalo                  | ..       | 23,559  | 24,332  | 25,134  |
| Sheep                    | ..       | 6,597   | 6,629   | 6,661   |
| Goat                     | ..       | 25,293  | 26,020  | 26,774  |
| Camels                   | ..       | 212     | 124     | 216     |
| Horses                   | ..       | 146     | 143     | 141     |
| Asses                    | ..       | 2,553   | 2,595   | 2,639   |
| Mules                    | ..       | 70      | 71      | 72      |
| Cocks & Hens             | ..       | 31,750  | 32,502  | 33,272  |
| Ducks Drakes & Ducklings | ..       | 89      | 82      | 75      |
| <b>Sindh</b>             |          |         |         |         |
| Cattle                   | 000 No's | 8,524   | 8,737   | 8,958   |
| Buffalo                  | ..       | 8,903   | 9,111   | 9,327   |
| Sheep                    | ..       | 4,229   | 4,265   | 4,302   |
| Goat                     | ..       | 15,988  | 16,442  | 16,914  |
| Camels                   | ..       | 342     | 351     | 359     |
| Horses                   | ..       | 30      | 28      | 25      |
| Asses                    | ..       | 1,403   | 1,456   | 1,511   |
| Mules                    | ..       | 31      | 33      | 34      |
| Cocks & Hens             | ..       | 19,338  | 20,006  | 20,822  |
| Ducks Drakes & Ducklings | ..       | 242     | 239     | 236     |



| <b>Balochistan</b>   |          |        |        |        |
|--|----------|--------|--------|--------|
| Cattle   | 000 No's | 2,616  | 2,664  | 2,714  |
| Buffalo  | ..       | 440    | 456    | 473    |
| Sheep  | ..       | 15,058 | 15,357 | 15,668 |
| Goat   | ..       | 14,651 | 15,033 | 15,429 |
| Camels   | ..       | 426    | 432    | 438    |
| Horses   | ..       | 82     | 85     | 88     |
| Asses  | ..       | 577    | 591    | 605    |
| Mules  | ..       | 12     | 12     | 13     |
| Cocks & Hens   | ..       | 8,275  | 8,593  | 8,923  |
| Ducks Drakes & Ducklings   | ..       | 5      | 5      | 4      |
| Source: (i) Livestock Wing, M/o Food Securities and Research, GOP, Islamabad Pakistan. |          |        |        |        |
| (ii) Pak. Economic Survey, GOP, Islamabad.   |          |        |        |        |
| (iii) Directorate of Animal Quarantine, Karachi, Pakistan.                             |          |        |        |        |

**Table No.3 showing the estimated Milk and Meat Production in Pakistan**

| Species                                     | Units    | 2014-15 <sup>1</sup> | 2015-16 <sup>1</sup> | 2016-17 <sup>1</sup> |
|---|----------|----------------------|----------------------|----------------------|
| <b>Milk (Gross Production)</b>              | 000 Tons | <b>52,632</b>        | <b>54,328</b>        | <b>56,080</b>        |
| Cow   | "        | 18,706               | 19,412               | 20,143               |
| Buffalo                                     | "        | 32,180               | 33,137               | 34,122               |
| Sheep <sup>2</sup>                          | "        | 38                   | 39                   | 39                   |
| Goat  | "        | 845                  | 867                  | 891                  |
| Camel <sup>2</sup>                          | "        | 862                  | 873                  | 885                  |
| <b>Milk (Human Consumption)<sup>3</sup></b> | 000 Tons | <b>42,454</b>        | <b>43,818</b>        | <b>45,227</b>        |
| Cow   | "        | 14,965               | 15,529               | 16,115               |
| Buffalo                                     | "        | 25,744               | 26,510               | 27,298               |
| Sheep                                       | "        | 38                   | 39                   | 39                   |
| Goat  | "        | 845                  | 867                  | 891                  |
| Camel                                       | "        | 862                  | 873                  | 885                  |
| <b>Meat<sup>4</sup></b>                     | 000 Tons | <b>3,696</b>         | <b>3,873</b>         | <b>4,061</b>         |
| Beef  | "        | 1,951                | 2,017                | 2,085                |
| Mutton                                      | "        | 671                  | 686                  | 701                  |
| Poultry meat                                | "        | 1074                 | 1,170                | 1,276                |

Source: Livestock Wing, M/O Food Securities and Research, GOP, Islamabad

**Table No.4 showing the estimated Livestock Products Production in the country for three years**

| Species                   | Units        | 2014-15 <sup>1</sup> | 2015-16 <sup>1</sup> | 2016-17 <sup>1</sup> |
|---------------------------|--------------|----------------------|----------------------|----------------------|
| Eggs                      | Million No's | 15,346               | 16,188               | 17,083               |
| <b>Hides</b>              | 000 No's     | <b>15,368</b>        | <b>15,886</b>        | <b>16,421</b>        |
| Cattle                    | "            | 7,816                | 8,111                | 8,416                |
| Buffalo                   | "            | 7,447                | 7,669                | 7,897                |
| Camels                    | "            | 105                  | 106                  | 108                  |
| <b>Skins</b>              | 000 No's     | <b>53,060</b>        | <b>54,278</b>        | <b>55,526</b>        |
| Sheep Skin                | "            | 11,132               | 11,264               | 11,397               |
| Goat Skin                 | "            | 26,359               | 27,073               | 27,807               |
| <u>Fancy Skin</u>         | "            | <u>15,569</u>        | <u>15,941</u>        | <u>16,322</u>        |
| Lamb skin                 | "            | 3,306                | 3,345                | 3,385                |
| Kid skin                  | "            | 12,263               | 12,595               | 12,937               |
| Wool                      | 000 Tons     | 44.6                 | 45.1                 | 45.7                 |
| Hair                      | "            | 25.8                 | 26.5                 | 27.2                 |
| Edible Offal's            | "            | 383                  | 394                  | 405                  |
| Blood                     | "            | 64.4                 | 66.1                 | 67.8                 |
| Guts                      | 000 No's     | 53,603               | 54,833               | 56,094               |
| Casings                   | "            | 16,347               | 16,895               | 17,461               |
| Horns & Hooves            | 000 Tons     | 55.5                 | 57.2                 | 58.9                 |
| Bones                     | "            | 827.2                | 852.3                | 878.2                |
| Fats                      | "            | 263.3                | 271.0                | 279.0                |
| Dung                      | "            | 1,171                | 1,207                | 1,244                |
| Urine                     | "            | 358                  | 368                  | 379                  |
| Head & Trotters           | "            | 238.8                | 245.6                | <b>252.5</b>         |
| Ducks, Drakes & Ducklings | Million No's | 0.5                  | 0.5                  | 0.5                  |

Source: Statistical analyzed data and Pak. Economic Survey Reports, GOP, ISBD.

Poultry Development Policy visions sustainable supply of wholesome poultry meat; eggs and value added products to the local and international markets. it is aimed at facilitating private sector-led development for sustainable poultry production. The strategy revolves around supporting private sector through regulatory measures.

### Government Policy Measures

Livestock Wing, with its redefined role under 18th Constitutional amendment, continued regulatory measures that included allowing import of high yielding animals, semen and embryos for the genetic improvement of indigenous dairy animals, allowing import of high quality feed stuff/micro ingredients for improving the nutritional quality of animal and poultry feed, allowing import of veterinary, dairy and livestock machinery / equipment at reduced duty rates and encourage establishment of value added industry in the country. Livestock

insurance scheme for farmers having 10 animals or more, introduced last year i.e. 2014-15 promoted cooperative dairy farming in the country. Zero rating on processed valued added chicken products has been withdrawn.

The estimated production of commercial and rural poultry and products for last three years is given below:

**Table No.5 showing the estimated Domestic/ Rural & Commercial Poultry in Pakistan**

| Type                              | Units               | 2014-15 <sup>1</sup> | 2015-16 <sup>1</sup> | 2016-17 <sup>1</sup> |
|-----------------------------------|---------------------|----------------------|----------------------|----------------------|
| <b>Domestic Poultry</b>           | <b>Million No's</b> | <b>83.32</b>         | <b>84.58</b>         | <b>85.86</b>         |
| Cocks                             | "                   | 10.95                | 11.24                | 11.55                |
| Hens                              | "                   | 40.18                | 40.90                | 41.64                |
| Chicken                           | "                   | 32.19                | 32.43                | 32.67                |
| Eggs <sup>2</sup>                 | "                   | 4,018                | 4090                 | 4164                 |
| Meat                              | 000 Tons            | 112.99               | 115.24               | 117.54               |
| <b>Duck, Drake &amp; Duckling</b> | <b>Million No's</b> | <b>0.48</b>          | <b>0.46</b>          | <b>0.44</b>          |
| Eggs <sup>2</sup>                 | "                   | 21.25                | 20.36                | 19.52                |
| Meat                              | 000 Tons            | 0.65                 | 0.62                 | 0.59                 |
| <b>Commercial Poultry</b>         | <b>Million No's</b> | <b>53.4</b>          | <b>56.9</b>          | <b>60.6</b>          |
| Layers                            | "                   | 42.65                | 45.64                | 48.83                |
| Broilers                          | "                   | 794.63               | 874.09               | 961.50               |
| Breeding Stock                    | "                   | 10.70                | 11.24                | 11.80                |
| Day Old Chicks                    | "                   | 829.99               | 912.99               | 1,004.29             |
| Eggs <sup>2</sup>                 | "                   | 11,307               | 12,077               | 12900                |
| Meat                              | 000 Tons            | 960.65               | 1,054.46             | 1,157.51             |
| <b>Total Poultry</b>              |                     |                      |                      |                      |
| Day Old Chicks                    | Million No's        | 862                  | 945                  | 1,037                |
| Poultry Birds                     | "                   | 932                  | 1,016                | 1,108                |
| Eggs                              | "                   | 15,346               | 16,188               | 17,083               |
| Poultry Meat                      | 000 Tons            | 1,074                | 1,170                | 1,276                |

Source: Pak. Economic Survey Reports of respective year-GOP.  
Livestock Wing, Ministry of Food Securities and Research, GOP.

Livestock Wing also provided facilitation for export of red meat. A total of 41.286 thousand tons of red meat was exported from July-March 2016-17. The export of meat fetched 135.036 million US\$. This meat was exported from private sector slaughterhouses. During same period export facilitation was also provided for livestock by- products like animal casings, bones, horns and hooves and

gelatin. The efforts continued for market access with the concerned authorities of Russia, China, South Africa, Egypt, Hong Kong and Indonesia through diplomatic channel for export of our meat and meat products.

Livestock Wing regulated import of superior quality semen and high yielding exotic dairy cattle of Holstein-Friesian and Jersey breeds for genetic improvement of indigenous dairy animals. During July- March, 2016 -17 a total of 1,556,565 thousand doses of semen and 9,123 exotic dairy cows were imported. The exotic dairy cows added approximately 70 million tons of milk per annum in the commercial milk chain/ system.

In order to facilitate dairy farmer, duty free import of calf milk replacer and cattle feed premix was allowed. During July-March 2016 -17 a total of 310.2 metric tons of calf milk replacer and 298.9 metric tons of cattle feed premix was imported. Similarly, to promote and encourage value added livestock processing industry in the country, duty free import of machinery for milk, beef, mutton and poultry processing was allowed.

During July- March 2016 -17, the Animal Quarantine Department (AQD) provided quarantine services and issued 28,217 Animal Health Certificates for the export of live animals, mutton, beef, eggs and other livestock products having value of US\$ 294.414 million. The AQD generated non-tax revenue of Rs. 103.232 million during July- March, 2016 -17 as certificate / laboratory examination fee of animal and animal products exported during the year.

The National Veterinary Laboratory (NVL), Islamabad is a national institution for service and regulatory support to national livestock wealth with mission to promote greater productivity and profitability from the livestock industries in Pakistan. The NVL conducted surveillance and diagnostic work on highly contagious diseases of animals. It also carried out activities on National and Regional Projects regarding prevention and control of Trans-boundary Animal Diseases in Pakistan. During July - March 2016-17 a total of 10,264 samples were analyzed tested for disease diagnosis and surveillance, veterinary vaccines and residue testing. These samples were submitted from provincial livestock

departments, development projects, ICT, AJK and FATA besides animal product exporters.

Livestock Wing also collaborated with international (OIE, FAO and EU) and regional organizations (SAARC, ECO, APHCA) for HRD and capacity building of national and provincial livestock institutions for diagnosis and control of animal diseases. Inter Provincial Coordination is being done by the Livestock Wing to implement the National Program to Control Foot & Mouth Disease and PPR disease and progressing on OIE FMD freedom pathway and moved to confirmed stage 02 of the 06 stage pathway. A National FMD Control Program at a cost of Rs. 764million for the period of six years has been made through from competent forums to sustain and continue project activities during subsequent years. This will help in improving animal health status of the country regarding transboundary animal diseases.

On account of concerted efforts, two member UAE technical team comprised of Dr. Mohammad Karim bin Jabarah and Dr. Mirfat Marhi Al Nauimat, visited Pakistan from 16 - 20th January, 2017. The delegation visited National Reference Laboratory for Poultry Diseases (NRLPD), NARC, National Veterinary Laboratories, Islamabad; Poultry Research Institute, Rawalpindi, Diagnostic Laboratory of University of Veterinary and Animal Sciences (UVAS), Lahore; Quarantine facilities, poultry farms / hatcheries and poultry processing plants, in order to witness / examine the diagnostic facilities, test protocols, inspection services, bio-security / bio-safety measures, standard operating procedure, (SOP), good management practices (GMP) and sanitary / hygiene etc. at these places. On receipt of inspection report from UAE technical team, Government of UAE has lifted ban on import of poultry and poultry products from Pakistan. This would go a long way in promoting export of poultry and poultry products from the country.

For this write-up recent data collected was used from the following sources:

- (i) Livestock Wing, Ministry of Food Securities and Research 2015-16 and 2016-17, GoP, Islamabad.

- (ii) Pak. Economic Survey Reports for the years 2014-15, 2015-16 and 2016-17, Ministry of Food Securities and Research, GoP, Islamabad.
- (iii) Pakistan Bureau of Statistics, Ministry of Statistics of Pakistan for the year 2015-16 and 2016-17.
- (iv) Provincial Livestock and Dairy Development Department (LDDDs) Balochistan, Khyber Pakhtoonisation, Punjab and Sindh, including AJK and NAs for the referred years.

## **REFERENCES:**

- Livestock Wing (2015) a, (2016) b and (2017) c: Updates on Livestock Sector, Ministry of Food Securities and Research, GoP, Islamabad.
- Director, Animal Qartentine Department, M/o Food Securities and Research, GoP, Islamabad.
- Director NVL (2015-16) and (2016-17), Research work done in recent years at National Veterinary Laboratories, NARC, Islamabad.
- Muhammad Hafeez (2011), Livestock Industry: Livestock and Poultry Production in Pakistan, HEC Publications section, Islamabad.
- Mashook Ali Bhutto (2015), Livestock to the year 2030. Pak.JLSc. Vol-VI, No.06 pp.265-269.
- Ejaz Wasti (2015-16) and (2016-17). Livestock Sector. Agriculture. Pak. Economic Survey Report, Ministry of Finance, GOP, Islamabad.
- PBS (2015-16) and (2016-17). Statistical data of Livestock and Livestock by-products. Pakistan Bureau of Statistics, Annual Reports, Ministry of Statistics, GOP, Islamabad.
- Directorates General (2015-16) and (2016-17). Livestock and Dairy Development Departments, Punjab, Lahore.
- Directorate General (2015-16) and (2016-17). Livestock and Dairy Development Department, Balochistan, Quetta.
- Directorate General (2015-16) and (2016-17). Livestock and Dairy Development Department, Sindh, Hyderabad.
- Directorate General (2015-16) and (2016-17). Livestock and Dairy Development Department, Khyber Pakhtun Khwa, Peshawar.

## INCIDENCE OF BLOOD PROTOZOANS IN DAIRY CATTLE IN KOHAT REGION, KHYBER PAKHTUNKHWA, PAKISTAN

Zabita Khan<sup>1</sup>, Shams-ul-Hayat<sup>1</sup>, Muhammad Rashid Khan<sup>1</sup>, Shabina Begum<sup>2</sup>,  
Muhammad Jamil Khan<sup>3</sup> and Bahrullah Khattak<sup>4</sup>

### ABSTRACT

A total of 311 blood samples were processed during the year 2015-16 for investigating the prevalence of blood protozoans in dairy cattle in kohat and surroundings. Thin blood smears were prepared from the samples in duplicate, were stained with giemsa stain and air dried. The smears were examined under 100x oil emersion lens of light microscope. Among the 311 blood samples, 70 blood samples (22.51%) were found positive for Theilariasis, 43 samples (13.83%) were found positive for Anaplasmosis whereas 28 blood samples (09.00%) were found positive for Babesiosis. The remaining 170 samples (54.66%) were declared negative for blood protozoans. The percentages of tick-borne pathogens among positive samples were, Theilaria (49.64%), Anaplasma (30.49%) and Babesia (19.85%). Keeping in view the findings of this study it is concluded that the prevalence of haemoprotozoan diseases is much higher in kohat region. It is recommended that the prevalence of these diseases should be investigated using modern techniques like ELISA and PCR in future. The farmers were advised to practice acaricidal spray, on regular basis, for controlling the vector ticks.

**Key words:** Prevalence, Theilaria, Babesia, Anaplasma, Ticks.

Received Article: May-2018    Accepted: September-2018    Published: December-2018

### INTRODUCTION:

Livestock is an important sector of agriculture, occupying unique position in the national economy of our country. The sector meets the domestic demand of milk, meat and eggs. It also provides net source of foreign earnings. More than 8.0 million rural families are involved in raising livestock. It is central to the livelihood of the rural poor in the country and plays important role in poverty alleviation and uplifting the socioeconomic conditions of rural population. (Pakistan Economic Survey 2016-17). The number of cattle in kohat region were 4,87,023 heads as per Livestock Census (2006) which indicate how much dairy cattle remain important for day to day earnings of people of this region. Most of the farmers small land holders, depend substantially on livestock for their routine earnings. Their livestock face several problems in the form of imbalanced.

<sup>1</sup>PRO/Director, Veterinary Research and Disease Investigation Centre, Kohat.

<sup>2</sup>College of Animal Husbandry and Veterinary Sciences, Abdul Wali Khan University Mardan.

<sup>3</sup>Ph.D. scholar department of Animal Sciences, Qaid-e-Azam University, Islamabad.

<sup>4</sup>Department of Zoology, Kohat University of Science & Technology, Kohat.



nutrition and different viral, bacterial and protozoal diseases. Blood protozoans including Theilaria, Anaplasma and Babesia are the major threats and limitations in good health, optimum productivity, working efficiency and increased cost for control measures as documented by Makala et al., (2003); and Rajput et al., (2005). These protozoan parasites remain serious constraint to cattle production in endemic areas, causing lethal infections in exotic cattle and considerable mortality in indigenous as well as crossbred animals (Forsyth et al., 1997).

Hemoprotozoans cause devastating losses to the livestock industry in the form of poor production and loss of valuable animals directly throughout the world. Theilaria, Babesia and Anaplasma cause anemia by inducing erythrophagocytosis thereby causing death of animals, if not treated properly, in time. Most of the hemoprotozoan parasites are tick borne and are of great economic importance in Asia and has always been a formidable barrier to the survival of exotic and cross bred cattle (Durrani et al., 2008).

Theilaria, Babesia and Anaplasma are considered to be the most important blood parasites of cattle and buffaloes in Pakistan. Sporadic cases of the diseases caused by these three protozoans are seen throughout the year Ashfaq et. al., (1983); Muhammad et. al., (1999); Zahid et. al., (2005). However, their outbreak in exotic and crossbred cattle is mostly reported was during the hot and humid months of the year. Current study was conducted from January to December 2015 in district kohat and surroundings to diagnose the prevalence of these diseases and bring awareness among the farmers community regarding their loss and control measures in the region.

## **MATERIAL AND METHODS:**

The present study was carried out at "Veterinary Research & Disease Investigation Centre Kohat, Khyber Pakhtunkhwa, from January 2015 to December 2015 for a period of twelve months. A Total of 311 blood samples were received/ collected during the year, 2015 in the laboratory for diagnostic purposes. Thin blood smears were prepared in duplicate for each sample as described by Afridi et al. (2005). The smears were fixed with absolute methanol stained with giemsa tain min, rinsed, air dried and examined at 100x magnification for

hemoprotozoans. The blood parasites were identified as described by various OIE publications (OIE, 2004, 2008a, b).

### STATISTICAL ANALYSIS:

The data were analyzed through MS Excel to calculate the percent prevalence of Theilariosis, Anaplasmosis and Babesiosis using the following formula; % Infection =(Total Number of Positive Samples/Total Number of Samples) x 100 : % infection =  $\frac{\text{total positive samples}}{\text{Total No. of samples}} \times 100$

Total No. of samples

### RESULTS AND DISCUSSION:

The total of 311 blood samples received/collected were diagnosed, 70 samples (22.51%) were found positive for Theilariosis, 43 samples (13.83%) were positive for Anaplasmosis whereas 28 blood samples (9.00%) were found positive for Babesiosis (Table II, Figure 02). The remaining 170 blood samples (54.66%) were declared negative for hemoprotozoan diseases (Table I, Figure 01). The percentages of tick-borne pathogens among positive samples were, Theilaria (49.64%), Anaplasma (30.49%) and Babesia (19.85%). The overall prevalence of hemoprotozoan diseases in this study (45.33%) was higher as compared to that of Alim et al., (2011) who conducted similar study in Chittagong Division, Bangladesh, reporting overall prevalence of 16.18% in cross breed and 12.02% in indigenous cattle breeds. The difference between the findings might be due to geographical location, distribution of tick's species and the way of samples collected (as most of the samples received in this study were from sick animals showing the symptoms of these particular diseases rather than random sampling). As for the prevalence of Babesiosis is concerned, similar findings were reported Alim et.al (2011) by them in same study i.e. 9.25% in the hilly areas comparable to the findings of this study where 9.00% prevalence was recorded. Similarly Atif et al., (2012) conducted study to investigate the prevalence of hemoprotozoan diseases in district Sargodha, Pakistan. Their findings are lower as compared to this study. They found an overall prevalence of 26.86%, Anaplasma 9.71%, Theilaria 6.86% and Babesia 6.57%. The difference between the findings might also be attributed to the difference in sampling method and control measures

adopted by the farmers. Among the positive cases almost similar finding were reported by Atif et al., (2012) for Anaplasmosis (29.06%) and Babesiosis (19.66%). Our findings are also in line with that of Ananda et al., (2009), reported overall prevalence of 43.18% in their study comparable with this study (45.33%).

### **CONCLUSION:**

It is concluded from this study that prevalence of blood protozoans is much higher in kohat region of Khyber Pakhtunkhwa. High incidence of hemoprotozoan diseases in the region may be due to lack of awareness/education in the people regarding control and precautionary measures as well as the free movement of Afghan refugees with their herds through this region, ultimately paving the way for increased prevalence of trans-boundary diseases of cattles in the region. As the farmers of this region are mostly poor and landless with poor managerial practices associated with heavy burden of tick's infested animals ultimately resulting in high incidence of hemoprotozoan diseases in the cattle population of the region.

### **RECOMMENDATIONS:**

Hemoprotozoan diseases are major threats to the livestock of poor farming community of this area. Its control is quite necessary to elude losses caused by these diseases. The following recommendations are made keeping in view the importance of the diseases;

1. Advance techniques including ELISA and PCR should be used in future to make the diagnostic procedure more sensitive and reliable.
2. Government coordinated farmer's education programs and regular screening through random sampling of animals may be practiced in future.
3. Regular acaricidal sprays should be used to control the vector ticks according to the following schedule;
  - a. Day 1<sup>st</sup> acaricidal spray.
  - b. 2<sup>nd</sup> spray after two weeks (fortnight) spray.
  - c. 3<sup>rd</sup> spray after 30 days.
  - d. 4<sup>th</sup> spray after two month of period.And then regularly, each month in the hot season (May to September).

## ACKNOWLEDGMENT:

We are thankful to Prof. Dr. Bahrullah Khattak, department of Zoology, Kohat University of Science and Technology, Kohat for his full cooperation for confirmation of blood protozoan parasites, in the present investigations and Dr. Muhammad Irshad, Department of Botany, Abdul Wali Khan University Mardan for his help in statistical analysis.

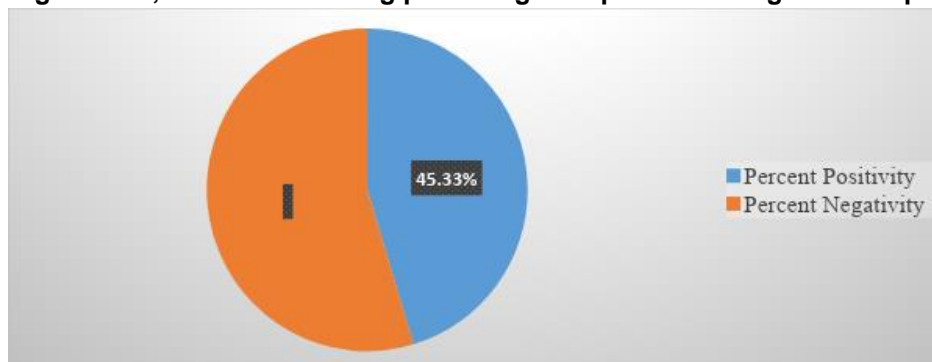
**Table No.1 showing the total number of samples tested with overall prevalence:**

| Total No. of Samples | Positive Samples | % Positivity | Negative Samples | % Negativity |
|----------------------|------------------|--------------|------------------|--------------|
| 311                  | 141              | 45.33%       | 170              | 54.66%       |

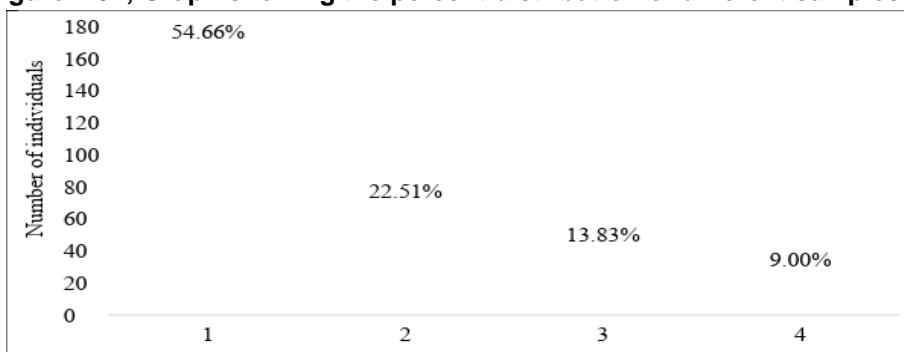
**Table No.2 showing the percent prevalence of hemoprotozoan diseases:**

| Total Negative Samples | Theilariosis    | Anaplasmosis    | Babesiosis     |
|------------------------|-----------------|-----------------|----------------|
| 170/311 (54.66%)       | 70/311 (22.50%) | 43/311 (13.82%) | 28/311 (9.00%) |

**Figure # 01; Pai chart showing percentages of positive & negative samples**



**Figure # 02; Graph showing the percent distribution of different samples:**



**REFERENCES:**

- Afridi, Z.K., Ahmad, I., Khattak, G.Z., Habibullah, Q., Jamil, M. (2005) Incidence of Anaplasmosis, Babesiosis and Theilariosis in dairy cattle in Peshawar. *Sarhad J. Agric.*, 21(3): 311-316.
- Alim, M.A., Das, S., Roy, K., Masuduzzaman, M., Sikder, S., Hassan, M.M., Siddiki, A.Z., Hossain, M.A (2011) Prevalence of hemoprotozoan diseases in cattle population of Chittagong division, Bangladesh. *Pakistan Veterinary Journal*, 32(2): 221-224.
- Ananda, K.J., D'Souza, P.E., Puttalakshamma, G.C. (2009) Prevalence of Haemoprotozoan diseases in cross bred cattle in Bangalore north. *Veterinary World*, 2(1): 15-16.
- Atif, F.A., Khan, M.S., Roheen, T., Muhammad, F., Younus, M., Avais, M., Ullah, S. (2013) Seroprevalence of *Anaplasma Marginale* infection among cattle from three districts of the northern Punjab, Pakistan. *The Journal of Animal & Plant Sciences*, 2013, 23(4): 995-998.
- Durrani, A.Z., Shakoory, A.R., Kamal, N. (2008) Bionomics of Hyalomma ticks in three districts of Punjab. Pakistan. *J. Anim. Pl. Sci.*, 2008; 18(1): 17-23.
- Makala, L.H., Mangani, P., Fujisaki, K., Nagasawa, H. (2003) The current status of major tick borne diseases in Zambia. *Vet. Res*; 34: 27-45.
- OIE. (2004). Manual of diagnostic tests and vaccines for terrestrial animals. Bovine babesiosis office international Des Epizooties, OIE, Paris, France.
- OIE. (2008a). Terrestrial Manual, Bovine Anaplasmosis, OIE, Paris, France.
- OIE. 2008b. Terrestrial Manual, Theilariosi, OIE, Paris, France.
- Wasti Ejaz (2014-15). Chapter-02, Pak. Economic Survey Report, Ministry of Finance, Economic Advisor's Wing, GOP, Islamabad, p.p. 38-49.
- Rajput, Z.I., Song-hua, H., Arijio, A.G., Habib, H., Khalid, K. (2005) Comparative study of Anaplasma parasites in tick carrying buffaloes and cattle. *J. Zhejiang Univ. Science*, 6B: 1057-1062.
- Zahid, I.A., Latif, M., Baloch, K.B. (2005) Incidence and treatment of theilariosis and babesiosis. *Pakistan Vet. Journal*, 25(3): 137-139.

## AN OVERVIEW OF THE TREND AND STATUS OF MATRIC AND FA STUDENTS FOR AGRICULTURE AND LIVESTOCK COURSES IN AIOU: PAPER EVALUATION OF FIVE SEMESTERS

Uzma Kanwal<sup>1</sup>, Nadia Hafeez<sup>2</sup> and Iram Shahzadi<sup>3</sup>

### ABSTRACT

This research cum status paper provides an update of students paper-evaluation of Agriculture and Livestock of Matric and FA who enrolled for various semesters of 2016 (Autumn and Spring), 2015 (Autumn and Spring) and 2017 (Autumn and Spring) with details of work done by the Agriculture and Livestock Panel, during the respective duration by the Sub: Examiners (S/Es) involved,, supervised by the Head Examiner (H/E), assisted by an Asstt: The matric course codes (Subjects) total evaluated were 211 (Poultry Science), 253 (Livestock Management), 254 (Livestock Production), 219 (Basic Agriculture Science), 256 (Agricultural production) and 257 (Vegetable production) while FA course codes (subjects) scripts evaluated were 313 (Dairy Sciences), 326 (Basic Agriculture practices), 327 (Farm Machinery), 328 (Oil seed crops), 329 (Horticulture), 342 (Agriculture Technologies), and 349 (Plant Protection). The total number of Answer Scripts evaluated (Quantum of work) shouldered by the team of this panel indicated (10046, 11442, 11075, 10209 and 10644 for semesters Spring-2015, Autumn 2015, Spring 2016, Autumn-2016 and Spring-2017 respectively, giving a mixed trend of enrolment of students, took the examination and were subjected for paper evaluation. As understood these course codes are not compulsory but students opt for these, at their own, to complete their matric and FA Programs at AIOU, with steady but increasing trend.

**Key words:** Agriculture Livestock Matric FA Student Enrolment, AIOU, Paper Evaluation.

Received Article: August-2017

Accepted: July-2018

Published: December-2018

### INTRODUCTION:

For each and every program, offered by Allama Iqbal Open University (AIOU) since 1976, immediate after annual (Final) examination, of each semester, the answer scripts (papers) are subjected to evaluation (Marking) by a panel of expert teachers, for relevant course codes and results declared accordingly. This process takes place for one –two months' painstaking rigorous exercise. This process comprises course code bundle preparation (with 250-280) answer scripts, enumerated, proformas filled in, signed by the main secrecy and transported to paper evaluation secrecy where registered examiners. {In the form of 7-8 Sub Examiners (S/Es) headed by the senior most subject specialist, Head Examiner (H/E)}, start working on the real critical evaluation and award of marks, pasting on the award lists (computerized) and returned with record of paper distribution and conformation (Proformas) duly signed (by all S/Es and H/E)

<sup>1</sup> School Teacher, Tutor and S/E, AIOU, Islamabad.

<sup>2</sup> School Teacher, NPfM School, Islamabad

<sup>3</sup> School Teacher, S/E, AIOU, Islamabad.

Similar Efforts are made by various subjects (codes), at Matric, FA, BA/E.Ed and MA/MSc., together with M.Ed and M.Phil courses. None of the subject panels carry out such work as this exercise, of publishing this information, due to shortage of time, over work, as well as by the time paper evaluation of one semester is completed, the process of remuneration starts. This is the routine of every academic and degree awarding institutions (Schools, colleges, universities Boards and Academics, in the various countries) hence Pakistan being No exception.

The Agriculture Group earlier made such efforts for publishing such information by Iram Shahzadi *et.al* (2015), Khizar Hayat *et.al* (2014) and Muhammad Hafeez *et.al* (2012) incorporating semester wise data and such information was appreciated in letter and spirit not only by students, teachers but also graduate researchers, specially those involved in Education Research at AIOU and elsewhere in the country.

The present efforts envisages the information comprising five semester's paper evaluation work of five semester namely spring-2015, Autumn-2015, Spring-2016, Autumn-2016 and Spring-2017 showing total papers evaluated as 11046, 11442, 11075, 10209 and 10644 respectively, as presented in tables No.01 through 05 of this write-up.

**Table No.01 showing the paper evaluation of Matric and FA students of Spring-015 (G-ID2731):**

**Work done December=015 and January-016**

| Matric             |           |           |             | FA           |           |             |         |
|--------------------|-----------|-----------|-------------|--------------|-----------|-------------|---------|
| Sr.#               | Code      | Bundles   | Scripts     | Sr.#         | Code      | Bundles     | Scripts |
| 01                 | 211       | 0         | 375         | 01           | 313       | 03          | 970     |
| 02                 | 253       | 01        | 321         | 02           | 326       | 04          | 1041    |
| 03                 | 254       | 01        | 326         | 03           | 327       | 04          | 1078    |
| 04                 | 256       | 06        | 1885        | 04           | 328       | 04          | 1014    |
| 05                 | 257       | 05        | 1601        | 05           | 329       | 03          | 947     |
|                    |           |           |             | 06           | 342       | 03          | 927     |
|                    |           |           |             | 07           | 349       | 02          | 561     |
| <b>Sub</b>         | <b>05</b> | <b>14</b> | <b>4508</b> | <b>07</b>    | <b>23</b> | <b>6538</b> |         |
| <b>Total</b>       |           |           |             |              |           |             |         |
| <b>Grand Total</b> |           |           |             | <b>11046</b> |           |             |         |

Source: Panel record for the semester, H/E Agri: and Livestock Group-AIOU, Islamabad.



**Table No.02 showing the paper evaluation of Matric and FA students during Autumn – 015 (work done in July-August-2016) G, ID=2870**

| Matric             |           |           |             | FA                |           |           |             |
|--------------------|-----------|-----------|-------------|-------------------|-----------|-----------|-------------|
| Sr.#               | Code      | Bundle    | Scripts     | Sr.#              | Code      | Bundle    | Scripts     |
| 01                 | 211       | 05        | 360         | 01                | 313       | 05        | 880         |
| 02                 | 253       | 02        | 260         | 02                | 326       | 05        | 578         |
| 03                 | 254       | 04        | 271         | 03                | 327       | 05        | 778         |
| 04                 | 256       | 11        | 2000        | 04                | 328       | 04        | 737         |
| 05                 | 257       | 13        | 2594        | 05                | 329       | 07        | 1004        |
|                    |           |           |             | 06                | 342       | 06        | 995         |
|                    |           |           |             | 07                | 349       | 05        | 1106        |
| <b>Sub. Total</b>  | <b>05</b> | <b>35</b> | <b>5485</b> | <b>Sub. Total</b> | <b>07</b> | <b>37</b> | <b>5878</b> |
| <b>Grand Total</b> |           |           |             | <b>11363</b>      |           |           |             |

Source: Panel record for the semester, H/E Agri: and Livestock Group-AIOU, Islamabad.

**Table No.03 showing the paper evaluation of Matric and FA students for AUT-2017 GID=3088**

| Spring-2016        |           |           |             |                   |           |           |             |
|--------------------|-----------|-----------|-------------|-------------------|-----------|-----------|-------------|
| Matric             |           |           |             | FA                |           |           |             |
| Sr.#               | Code      | Bdl.      | Total       | Sr.#              | Code      | Bdl.      | Total       |
| 01                 | 211       | 03        | 293         | 01                | 313       | 04        | 814         |
| 02                 | 253       | 01        | 140         | 02                | 326       | 04        | 912         |
| 03                 | 254       | NIL       | NIL         | 03                | 327       | 04        | 569         |
| 04                 | 256       | 05        | 192         | 04                | 328       | 04        | 594         |
| 05                 | 257       | 12        | 2437        | 05                | 329       | 05        | 822         |
|                    |           |           |             | 06                | 342       | 04        | 856         |
|                    |           |           |             | 07                | 349       | 05        | 1255        |
| <b>Sub. total</b>  | <b>05</b> | <b>12</b> | <b>3062</b> | <b>Sub. Total</b> | <b>07</b> | <b>30</b> | <b>5822</b> |
| <b>Grand Total</b> |           |           |             | <b>8884</b>       |           |           |             |

Source: H/E's Panel record of Agriculture Group, AIOU, Islamabad.

## MATERIAL AND METHODS:

For the preparation of this research-cum-status article, the following records, reports and panel H/Es folders were consulted:

- Semester wise record of Spring-2015, Autumn-2015, Spring-2016, Autumn-2016 and Spring-2017.
- The Script Distribution proformas for each bundle of any code.
- The remuneration notification proforma from the H/Es folders.
- The record notification of enhancement of paper evaluation for Matric, FA and BA scripts.

Since some of the semesters remuneration bills of S/Es H/Es and Assistant to H/E could not be collected, only the increase of matric scripts from Rs.13/- to Rs.17/- and FA scripts from Rs.14/- to Rs.18/- each was welcomed by majority of S/Es and H/Es while the Assistants to H/Es remuneration was not enhanced which was openly demanded.

## **RESULTS AND DISCUSSION:**

### **RESULTS:**

- i. The papers evaluated by Agriculture and Livestock (Panel) Group (G-ID-2731) in Spring-2015 (work done in December, 2015 to January 2016) comprised 14 bundles of 05 codes of Matric (Codes 211, 253, 254, 256 and 257) and 23 bundles of 07 codes of FA (codes 313, 326, 327, 328, 329 342 and 349) with an overall quantum of 37 bundles (12 codes) totally 11,046 answer scripts respectively, as presented in table No.01.
- ii. During the semester Autumn-2015, a total of 35 bundles of 05 codes of Matric (Codes 211, 253, 254, 256 and 257) and 37 bundles of 07 codes of FA (codes 313, 326, 327, 328, 329 342 and 349) were evaluated respectively with an overall quantum of 72 bundles pertaining to 12 codes, totally 11442 papers evaluated, as shown in table No.2.
- iii. Similarly the Spring-2016 work done showed 21 bundles pertaining to 05 codes of Matric (Codes 211, 253, 254, 256 and 257 while a total of 30 bundles pertaining to 07 codes of FA (codes 313, 326, 327, 328, 329 342 and 349) of Agriculture and Livestock subjects, with a total quantum of 51 bundles of 11 codes and evaluation of 11075 answer scripts, was done respectively, as detailed in table No.3.
- iv. The work done in Autumn-2017 (carried out in June-August-2017) by the Agriculture and Livestock Panel (G-ID=3088) evaluated 13 bundles of 6 codes of Matric with scripts evaluated as 2530 while 32 bundles pertaining to 07 codes of FA totaling the semester quantum of 45 bundles of 12 codes (Cumulatively for Matric and FA) to the tune of 10209 answer scripts respectively, as presented in table No.4.
- v. The very recent efforts of the Agriculture and Livestock Panel with G-ID-3168, evaluated 19 bundles of 05 codes of matric while 31 bundles

pertaining to 07 codes of FA cumulatively this panel successfully completed work load of 50 bundles of 11 codes evaluating 10644 answer scripts respectively, over a period of one and a half month, for semester Spring-2017, as presented in table No.5 with a summarized total work, semester wise, detailed in table No.6.

**Table No.04 showing the paper evaluation of Matric and FA students for AUT-2017 GID=3088**

| Work-June-August-2017 |           |           |             |                  |           |           |             |
|-----------------------|-----------|-----------|-------------|------------------|-----------|-----------|-------------|
| Matric                |           |           |             | FA               |           |           |             |
| Sr.#                  | Code      | Bdl.      | Total       | Sr.#             | Code      | Bdl.      | Total       |
| 01                    | 211       | 03        | 451         | 01               | 313       | 03        | 591         |
| 02                    | 219       | 01        | 169         | 02               | 326       | (Pkts.)   | 41          |
| 03                    | 256       | 04        | 907         |                  | 326       | 02        | 420         |
| 04                    | 257       | 05        | 1003        | 03               | 327       | 01        | 277         |
| 05                    | 253       | NIL       | NIL         | 04               | 328       | 04        | 680         |
| 06                    | 254       | NIL       | NIL         | 05               | 329       | 06        | 1226        |
|                       |           |           |             | 06               | 342       | 05        | 1119        |
|                       |           |           |             | 07               | 349       | 11        | 2767        |
| <b>Sub total</b>      | <b>04</b> | <b>13</b> | <b>2530</b> | <b>Sub total</b> | <b>07</b> | <b>32</b> | <b>7021</b> |
| <b>Grand total</b>    |           |           |             | <b>9551</b>      |           |           |             |

Source: H/E's record of each semester work done, AIOU, Islamabad.

**Table No.05 showing the paper evaluation of Matric and FA students for Spring- 2017 G-ID 3168 (Work done in December-2017 + Jan/Feb 2016)**

| Matric             |           |           |             | FA               |           |           |             |
|--------------------|-----------|-----------|-------------|------------------|-----------|-----------|-------------|
| Sr.#               | Code      | Bdl.      | Total       | Sr.#             | Code      | Bdl.      | Total       |
| 01                 | 211       | 02        | 311         | 01               | 313       | 03        | 536         |
| 02                 | 254       | 02        | 311         | 02               | 326       | 01        | 212         |
| 03                 | 219       | 05        | 1109        | 03               | 327       | 01        | 231         |
| 04                 | 257       | 10        | 2470        | 04               | 328       | 03        | 655         |
|                    |           |           |             | 05               | 329       | 05        | 1108        |
|                    |           |           |             | 06               | 342       | 05        | 1020        |
|                    |           |           |             | 07               | 349       | 13        | 2681        |
| <b>Sub total</b>   | <b>04</b> | <b>19</b> | <b>4201</b> | <b>Sub total</b> | <b>07</b> | <b>31</b> | <b>6443</b> |
| <b>Grand total</b> |           |           |             | <b>10644</b>     |           |           |             |

Source: H/E's record of each semester work done, AIOU, Islamabad.

**Table No.06 showing the total quantum of work done for five semesters of AIOU of both Matric and FA courses**

| Sr.# | Semester | Year | Group-ID | Total paper evaluated |
|------|----------|------|----------|-----------------------|
| 01   | Spring   | 2015 | 2731/-   | 10046/-               |
| 02   | Autumn   | 2015 | 2870/-   | 11442/-               |
| 03   | Spring   | 2016 | 3212/-   | 11075/-               |
| 04   | Autumn   | 2016 | 3088/-   | 10209/-               |
| 05   | Spring   | 2017 | 3168/-   | 10644/-               |

Source: H/E's record of each semester work done, AIOU, Islamabad.

## DISCUSSION:

As understood Agriculture and Livestock courses, when offered by the Department of Agriculture Sciences (DAS), AIOU, it was decided that these course-codes remain not in any semester (either Autumn or Spring semester) of a year, since 1986, these are being offered at Matric and FA level. With the passage of time, when these courses were started, amendment and improvements in the text books of these courses, continued after 3-4 years, with addition of new courses as per demand of the Farmers (both in Agriculture and Livestock Sector). As recently Poultry Assistant Diploma Course FA level has been, under finalization. The enrolment of subjects are increasing sustainably, if we look into the past 10-15 years, or more, one of the Authors, Dr. M. Hafeez remained course coordinator during 2002 to 2008, when Master's degree courses of Agriculture extension, Livestock Management, Forestry Extension and Rural Development were developed and implemented (these are still being offered) and written test based admissions are provided to applicants). The enrolments of students in courses of Livestock Management are increasing which shows the interest of younger generation from throughout the country. Such students when evaluated through as per checking, written sometimes, local names for weeds of various seasons and crops.

The enrolment of students prior to 2010-11 was less than 60-40 (both Matric and FA students), and since our quantam has been limited to those students who took the final examination of any semester were filtered through the paper evaluation panel, while the actual number of enrolled might be greater than this. It can be seen, as evidence through our record, that the number increased to

8034 in 2014 while it reached to 10,064, 11075, 11442 and 10644 in the years, 2015, 2016 and 2017 respectively.

### **CONCLUSIONS:**

It can be conveniently concluded that:

- (i) The interest of new students is increasing steadily.
- (ii) The agriculture and livestock courses both at matric and FA were sustainably enrolled, although Non-Obligatory, Optional.
- (iii) The paper evaluation indicated the enrolments from almost all regions of the country.
- (iv) Although there is no such counseling for new students the enrolment indicated, the inclinity of individual students (both males and female students) for these subject, appear any based on the interest of the students.

### **RECOMMENDATIONS:**

Based on various evaluations, since last 17 years, the following recommendations are endeavored:

- (i) Student's counseling at AIOU headquarters (H-8 Islamabad) and the Regional Directorates, may be started, so that students are briefed, oriented and their interest is created for Livestock and Agriculture courses.
- (ii) The text books of Matric and FA courses need be updated (as some of the replies-read in the answer scripts remain back dated).
- (iii) Some of the additional course code need also be developed, which should meet the economic importance of Livestock and Agriculture sector in Pakistan.

### **ACKNOWLEDGEMENT:**

The authors are thankful to the Head Examiner, Agriculture and Livestock panel AIOU Dr. M. Hafeez for communicating records and streaming this article for publication.

## REFERENCES:

- Iram Shahzadi, Memoona Khan, Bilal Mansoor, Saima Bibi and Muhammad Hafez (2015). Observation of interest of matric and FA students in Agriculture and Livestock subjects as revealed through paper evaluation at AIOU, Islamabad. Pak.JLSc, Vol- VII, No.7, pages: 543-551.
- Khizar Hayat, Muhammad Hafeez, Iram Shahzadi, Bilal Mansoor, Muhammad Ibrahim, Shabnam Kayai and Qurat ul Ain (2014). The increasing enrolment of Agriculture and Livestock subjects in Matric and FA level at AIOU: paper evaluation comparison of two semester of 2013. Pak.JLSc. Vol-VI, no.6, pages: 401-409.
- Muhammad Hafeez, Tabinda Khawaja, Fahad Karim, Bilal Mansoor, M. Ibrahim and Iram Shahzadi (2012). Increasing Trend of enrolment of Matric and FA students in Agriculture and Livestock, At AIOU as observed through paper evaluation of four semesters Pak.JLSc, Vol-IV, No.4, 31, pages: 25-264.
- Controller of Examinations (2016-17): Enhancement of Remuneration of paper evaluation at AIOU for Matric, FA and BA, official notification.
- Muhammad Hafeez and Shahid Javed (2016). Poultry Industry and Layer Production courses; Poultry Assistant's Diploma course, under final stages of printing, AIOU, Islamabad.

## THE IMPACT OF FDI ON THE GDP GROWTH IN AGRICULTURAL RELATED SECTORS OF CONSTRUCTION, TRADE AND TRANSPORT OF PAKISTAN

Basharat Mehmood<sup>1</sup>, Arshad Ali<sup>2</sup>, Tahir Mahmood<sup>3</sup> and Sarfraz Ahmad<sup>4</sup>

### ABSTRACT

The endeavor of this research article describes the Foreign Direct investment (FDI) inflow to Pakistan in the investigative study and its impact on Agricultural related Construction (CR), Trade (TD) and Transport (TN) towards informal employment, with the objectives to determine whether FDI had any impact on CR, TD and TN sectors. The data obtained from Pak economic Survey Reports, WDI, IMF, Asian Development Bank and SAARC Secretariat for the years 1980-85 through 2015, splitted into 07 tenures of 05 years each, as (a) 1980-84, (b) 1985-89, (c) 1990-94, (d) 1995-99, (e) 2000-04, (f) 2005-09 and (g) 2010-15. The Agricultural related CR sector informal employment mean values recorded for these tenures (%) were  $1.27 \pm 0.03$ ,  $1.66 \pm 0.09$ ,  $2.05 \pm 0.04$ ,  $2.35 \pm 0.00$ ,  $2.31 \pm 0.06$ ,  $2.99 \pm 0.15$ , and  $3.91 \pm 0.09$  for (a) thru (g) respectively. While Agricultural TD Sector informal employment mean values (in percentage) were  $2.91 \pm 0.07$ ,  $3.32 \pm 0.09$ ,  $3.92 \pm 0.09$ ,  $4.96 \pm 0.10$ ,  $5.64 \pm 0.24$ ,  $7.51 \pm 0.37$  and  $8.46 \pm 0.11$  percent. Similarly Transport Sector informal employment mean values were  $1.21 \pm 0.02$ ,  $1.35 \pm 0.05$ ,  $1.62 \pm 0.04$ ,  $1.85 \pm 0.08$ ,  $2.15 \pm 0.11$ ,  $2.61 \pm 0.04$  and  $2.94 \pm 0.05$  percent respectively. The FDI inflow to Pakistan from various developed countries namely US, UK, UAE, Japan, Hong Kong, Switzerland, Saudi Arabia, Germany, South Korea, Norway and China for the recent tenure periods of (i) 2000-2005, (ii) 2006-2010, (iii) 2011-2016 amounting to 1266.45, 3762.62, and 1628.69 million US Dollars (USD) respectively. The data on GDP growth w.e.f. 1980-85 through 2014-15, as evidenced, (amidst fluctuations) for the study period (mean values) of the tenure of a, b, c, d, e, f and g were  $7.63 \pm 0.85$ ,  $6.28 \pm 0.53$ ,  $4.72 \pm 0.96$ ,  $2.98 \pm 0.73$ ,  $4.67 \pm 0.90$ ,  $4.68 \pm 1.08$ , and  $3.15 \pm 0.50$  percent respectively. The maximum (max.) and minimum (min.) values of GDP growth rate provided the range for these tenures as (a) max. = 10.21 and min. = 5.06, (b) max = 7.62 and min = 4.95, (c) max = 7.70 and min = 1.75, (d) max = 4.96 and min = 1.01, (e) max = 7.36 and min = 1.98, (f) max = 7.66 and min=1.70 and (g) max=4.71 and min = 1.6 respectively.. Economic growth of any country was the reflection of its GDP growth, as main indicator. The statistical approach for analyzing the data included Auto-Regressive Distributive lag (ARDL) approach. Co-integration equations were negative and significant showed long run relationship between variables. The results thus obtained were presented in the tabulated form. It was concluded that FDI had a positive impact on the informal employment in agricultural Construction, Trade and Transport Sectors of Pakistan.

**Key Words:** FDI, Informal Employment Agricultural Sectors Construction, Trade and Transport Economic Growth Pakistan.

Received Article: June-2018

Accepted: September-2018

Published: December-2018

### INTRODUCTION:

The concept of informal employment pertain to un-registered workers, non-tax payers and self-employed workers, the informal sector or informal economy denotes that part of an economy which is not taxed, not monitored by any firm or government nor included in any Gross National Product (GNP), unlike the formal

<sup>1</sup>Technical Consultant, LDF, Islamabad.

<sup>2</sup>Lecturer of Economics, Post Graduate College (H-8), Islamabad.

<sup>3</sup>Assistant Professor of Economics, H-8, Islamabad. M.Sc. Economics.

<sup>4</sup>Vice Principal, IMCB, Bhara Kau, Islamabad.



economy Research workers have analyzed FDI and Informal Employment such as Zeba Amjad (2012) cross examined the secondary data of almost 30 years from (1980 to 2010), obtained from State Bank of Pakistan (SBP), World Bank (WB), Pak. Bureau of Statistics (PBS) and other sources, and inferred that there was positive relation between informal employment and Foreign Direct Investment (FDI), in Pakistan. Many sectors have been related to FDI in various projects, involving FDI but she has evidenced little relationship with informal employment on sustainable basis. Finally concluded and recommended that informal economy, specially in Agriculture Sector, be included in the Government Policy and a working group be established to regulate it with a Strategic Action Plan for Registration and accounting methods.

The total population of the country as recorded in the recent National Population Census-2017 as 202.77 millions, compared to 194.17 millions in the previous year, with a population growth of 2.1%. Out of this total population 59.9 millions were employed (32%) while the remaining (68%) were not formally employed. Out of the majority of this population (with the age of 18-50 years) remained informally employed. It has been indicated that FDI received from UK, US, UAE, China, Italy, Hong Kong and Switzerland was being utilized in developmental projects, under which certainly the informal employment was also generated, leading to progressive economic growth in the country. This has been discussed not only by Pakistani researchers such as Wasti Ejaz during the year (2013-14), (2014-15) and (2016-16), Bilawal *et al.*, (2014), Isran and Isran (2012) and Ramzan *et al.*, (2013), but also the Regional Researchers namely Rizvi and Nishat (2009), supported by International worker's reports such as Chen (2007), Karlsson *et al.*, (2007) Kawaguchi (2008) and some recent work reported by Hussain and Haque (2016).

The Agricultural Sectors informal economy comprised termed as household enterprises, Tunnel Farming, Trade of grains, vegetables and fruits, engaged in the production of by-products of Livestock allied industries and services with the primary objective of generating employment and income to the stake holders concerned, not necessarily with the deliberate intention of evading the payment of taxes or other legislative or administrative provisions.

A very important aspect of economic growth of developing countries is the FDI's pivotal role in various Sectors of informal employment such as in the Agricultural value addition. Pakistan being a country with steady and sustained economic growth has shown positive results in the recent years in crops, grains, vegetables and fruits and as a result, our Gross Domestic Products (GDP) has also shown sustained increase. The informal employment has been identified both in formal and informal sectors of Pakistan, indicated (i) Service Sector, (ii) Manufacturing Sector (iii) Electricity Consumption and (iv) Agricultural and Livestock construction and communication etc.

The role and impact of FDI on employment opportunities, specially on Agriculture and Livestock value addition, have been compared through Empirical evidence from Pakistan, India and China with the result that GDP has a significant impact on the level of employment in all of the three countries duly reported by Rizvi and Nishat (2009) during the period 1985-2008 analyzing the data from 1980 to 2010, using OLS model finding positive relationship between informal employment and FDI, based on statistical evidence.

Characterizing the nature of Self employed into four broad based categories as (i) Manufacturing, (ii) Trade, (iii) Transport and (iv) Agriculture and Services, describing informal aspect, investigated 1500 manufacturing units throughout the country including agriculture, pointed out non-manufacturing Sectors where up to 37% informal employees as against the wage employees of 73% in manufacturing Sector prevailed, as pointed out in their Research Report of Pakistan Institute of Development Economics (PIDE-2012-13) Islamabad.

A few case studies on the impact of FDI on Economic Growth, specially on Agriculture and Livestock Sector by Gudaro *et al.*, (2010), Impact of Trade openness and macroeconomic variables on GDP growth of Pakistan by Ramzan *et al.*, (2013) and impact of trade liberalization on economic growth by Shaheen *et al.*, (2013) are reported who analyzed data of 1975 to 2010 and pointed out that FDI's, the GDP and employment are positively related while Muhammad Hafeez *et al.*, (2015-16) and Shafiq Qadir Memon *et al.*, (2016) focusing on increased Livestock and Agricultural Production by the year 2030 and beyond for

our domestic needs forwarded their determination probing FDIs possible role in the informal employment, in these sectors.

The subject of Informal Employment being a critical subject, not only in Pakistan but in almost all developing countries, specially in South Asia, it has not been documented on a larger scale where the FDI is being utilized (and non documented informal sector of our country) which need to be investigated as pointed out by (Ahmed Abdul Rehman Khder Aga, 2014) from Turkey, stating that developing economies need to introduce economic openness in financial management.

The financial assistance as pointed out by workers at home and abroad utilized in not only major sectors of Agriculture, Construction, Trade, Transport including Manufacturing but also wide range of services being rendered by thirty to forty percent labor force (which stood undocumented), needs to be brought under documentation/Registration. These can be identified as (i) Casual labor, (ii) Contractual labor, (iii) People involved in Trade Field farmers and workers of food stores (iv) while work charged people (hired on 25 days a month) need to be brought on record.

#### **MATERIAL AND METHODS:**

1. This study was carried out, from time series data taken from the years 1980 to 2015 put into Splitted Tenures periods of five year each.
2. Data taken from State Bank of Pakistan (SBP), Federal Bureau of Statistics (FBS), and Pakistan Economic Survey Reports, of these years.
3. The data was subjected to our analysis to find out the impact on Economic growth (EG). The increase or decrease in GDP, the inflow of Foreign Direct Investment (FDI) and its relationship was investigated with informal employment in three sectors namely (i) Agricultural and Livestock related Construction (CR), (ii) Trade (TD) and Transport (TN).
4. The statistical approach, analyzing the data included Auto Regression Distributive lag (ARDL) through E-Views-09 was used as per statistical Package. The results thus obtained have been presented in tabulated form.

**RESULTS:**

The statistically evidenced results obtained in the study are summarized below:-

**(a) FDI inflow in Pakistan:** As we splitted our time series data w.e.f 1980 through 2015 into Seven equal Splitted Tenure Periods (STPs) as 1980-84 (a), 1985-89 (b), 1990-94 (c), 1995-99 (d), 2000-2004 (e), 2005-2009 (f), and 2010-15 (g), it was easier for us not only to get quicker results but fluctuations were minimized. It was observed that there was a positive increase of 133%, 137.86%, 42.90% , 69.40% and 276.30% in the period a, b, c, d, e and f sustainably while in the last period of 2010-15, (g) there was a decrease of - 63.60%. The maximum (max) and minimum (min) amount in million US Dollars (USD) has been presented in table-No-01 indicated mean figers of FDI to Pakistan in the tenures a, b, c, d, e, f, and g were  $75.31 \pm 12.69$ , (min= 29.45 and max = 131.38),  $175.48 \pm 19.67$  (min= 105.73 and max= 245.26),  $417.41 \pm 32.21$  ( min= 258.41 and max= 722.63), 596,  $84 \pm 75.65$  (min= 308 and max = 921.97),  $1011.4 \pm 150.89$  ( min= 378 and max= 2201),  $3806 \pm 732.18$  (min= 2022 and max= 5590) and  $1383 \pm 190.89$  (min= 959 and max= 1807) respectively.

**(b) Statistical Evidence:-**

The Statistical results were obtained employing Trace Test, Max-Eigen Values Test, Co-Integration and P Values of GDP and FDI, Critical Values are Presented in Part-A and B of Table-No-03.

**Informal Employment:**

The following Sectors, including agriculture value addition sectors results are detailed below:-

**(i) Agricultural Construction Sector:**

The Informal Employment was recorded in Construction Sector of Pakistan as 1.24%, 1.68%, 2.02%, 2.35%, 2.33%, 3.05% and 3.97% with a steady increase in the five years tenures of a, b, c, d, e, f and g respectively except a little decrease in the years 2000-2004 (tenure-e) as appears in table No-04. It was observed that positive and significant relationship existed between CR and IE. If we increased 1% unit in CR

Sector, the response would increased by 0.70% in IE as appears in table No-04 and 12.

**(ii) Agricultural Trade Sector:**

Trade Sector showed a successive increase in utilizing FDI in various tenures a, b, c, d, e, f and g to the tune of 2.94%, 3.33%, 3.97%, 5.00%, 5.66%, 7.27% and 8.43% respectively as presented in the same table No 4. Trade Sector showed positive and significant relationship between TR and IE. If we increased 1% in TR Sector then in response, there would be an increase of 0.59% in IE as presented in table No.06 and 12.

**(iii) Agricultural Transport Sector:**

FDI was utilized for Informal Employment to the tune of 1.18%, 1.39%, 1.61%, 1.88%, 2.19%, 2.66% and 3.49% for tenures a, b, c, d, e, f and g respectively as appears in table No-04. The Sector Showed positive and significant relationship between TN and IE but If we increased 1% unit in TN Sector, then the response would be a decrease of 1.96% in IE as presented in table No. 05 and 12.

**(iv) Foreign Direct Investment (FDI):**

There was a positive and significant relationship between FDI and IE but If we increased 1% unit in FDI, the response would be 0.074% increase of IE, as presented in table No. 12.

**(v) Gross Domestic Products (GDP):**

There was a negative and insignificant relationship between GDP and IE but If we increased 1% unit in GDP, the response would be decreased by 1.81% in IE. Because the Informal Employment (IE) also included other activities, such income could not be included in GDP, as presented in table No-12.

**Table No-01 Showing the Mean Values of FDI in Pakistan of Seven splitted tenure Periods w.e.f 1980-84 to 2011-2015 (million USD) in Agriculture and construct related**

| Sr #         | Tenures No | Actual Tenure Years | Frequency | Max              | FDI inflow (in Pakistan) |                 |                         |
|--------------|------------|---------------------|-----------|------------------|--------------------------|-----------------|-------------------------|
|              |            |                     |           |                  | Min                      | Mean            | %Increase+ or Decrease- |
| 01           | (a)        | 1980-84             | 05        | 131.38           | 29.45                    | 75.31           |                         |
| 02           | (b)        | 1985-89             | 05        | 245.26           | 105.73                   | 175.48          | +133%                   |
| 03           | (c)        | 1990-94             | 05        | 722.63           | 258.41                   | 417.41          | +137.86%                |
| 04           | (d)        | 1995-99             | 05        | 921.97           | 308                      | 596.84          | +42.90%                 |
| 05           | (e)        | 2000-04             | 05        | 2201             | 378                      | 1011.4          | +69.40%                 |
| 06           | (f)        | 2005-09             | 05        | 5590             | 2022                     | 3806            | +276.30%                |
| 07           | (g)        | 2010-15             | 06        | 1807             | 959                      | 1383            | -63.60%                 |
| <b>Total</b> |            |                     |           | <b>11,619.24</b> | <b>4,060.59</b>          | <b>7,481.44</b> |                         |

Source : WDR of respective years, IMF-World Bank Reports. Pak. Economic Survey Reports.

**Table No-02 Showing Informal Employment (%) for Seven splitted tenure, w.e.f. 1980 through 2015 in Pakistan in Agricultural related sectors.**

| S.No | Ten-ures | Actual Tenure Years | Frequency | Construc-tion | Trade | Trans port | GDP  |
|------|----------|---------------------|-----------|---------------|-------|------------|------|
| 01   | (a)      | 1980-84             | 05        | 1.24          | 2.94  | 1.18       | 7.29 |
| 02   | (b)      | 1985-89             | 05        | 1.68          | 3.33  | 1.39       | 6.42 |
| 03   | (c)      | 1990-94             | 05        | 2.02          | 3.97  | 1.61       | 4.53 |
| 04   | (d)      | 1995-1999           | 05        | 2.35          | 5     | 1.88       | 3.40 |
| 05   | (e)      | 2000-2004           | 05        | 2.33          | 5.66  | 2.19       | 4.33 |
| 06   | (f)      | 2005-2009           | 05        | 3.05          | 7.27  | 2.66       | 4.63 |
| 07   | (g)      | 2010-2015           | 06        | 3.97          | 8.43  | 3.49       | 4.32 |

Source: IMF World Bank Reports, Pak. Economic Survey Report of these years

**Table- No-03 Showing Country wise FDI inflow to Pakistan (Mean Values) w.e.f. 2000-2001 through 2014-2016.(In Million USD) from Various Developed Countries**

| Sr.#         | Countries    | 2000-2005       | 2006-2010       | 2011-2016       |
|--------------|--------------|-----------------|-----------------|-----------------|
| i            | US           | 285.26          | 759.74          | 168.28          |
| ii           | UK           | 138.38          | 417.08          | 217.11          |
| iii          | UAE          | 345.5           | 391.14          | 97.51           |
| iv           | Japan        | 24.48           | 59.98           | 34.96           |
| v            | Hong Kong    | 12.43           | 132.8           | 128.51          |
| vi           | Switzerland  | 87.91           | 170.48          | 95.46           |
| vii          | Saudi Arabia | 67.46           | 76.46           | 51.63           |
| viii         | Germany      | 13.18           | 59.92           | 15.45           |
| ix           | South Korea  | 1.38            | 3               | 18.15           |
| x            | Norway       | 78.81           | 89.9            | 130.25          |
| xi           | China        | 3.28            | 175.62          | 337.75          |
| xii          | Others       | 208.38          | 1426.5          | 333.63          |
| <b>Total</b> |              | <b>1,266.45</b> | <b>3,762.62</b> | <b>1,628.69</b> |

Source : IMF, World Bank, SAARC STAT- 2010-2016

**Table No.04 Showing the Mean Values of Agricultural, Livestock and allied Construction Sector in Pakistan of Seven Consecutive Periods w.e.f 1980-84 to 2011-2015**

| Sr. No.      | Tenure No | Actual Years | Fre-quency | Construction Sector |              |              |      |      |
|--------------|-----------|--------------|------------|---------------------|--------------|--------------|------|------|
|              |           |              |            | Max                 | Min          | Mean         | SD   | SE   |
| 01           | (a)       | 1980-84      | 05         | 1.37                | 1.18         | 1.27         | 0.07 | 0.03 |
| 02           | (b)       | 1985-89      | 05         | 1.91                | 1.42         | 1.66         | 0.21 | 0.09 |
| 03           | (c)       | 1990-94      | 05         | 2.18                | 1.93         | 2.05         | 0.11 | 0.04 |
| 04           | (d)       | 1995-99      | 05         | 2.39                | 2.32         | 2.35         | 0.02 | 0.00 |
| 05           | (e)       | 2000-04      | 05         | 2.46                | 2.16         | 2.31         | 0.14 | 0.06 |
| 06           | (f)       | 2005-09      | 05         | 3.46                | 2.52         | 2.99         | 0.35 | 0.15 |
| 07           | (g)       | 2010-15      | 06         | 4.21                | 3.62         | 3.91         | 0.24 | 0.09 |
| <b>Total</b> |           |              |            | <b>17.98</b>        | <b>15.15</b> | <b>16.54</b> |      |      |

**Table No.05 Showing the Mean Values of Agricultural Transport Sector in Pakistan, seven STP w.e.f 1980-84 to 2011-2015**

| Sr. No.      | Tenure No | Actual Years | Fre-quency | Transport Sector |              |              |      |      |
|--------------|-----------|--------------|------------|------------------|--------------|--------------|------|------|
|              |           |              |            | Max              | Min          | Mean         | SD   | SE   |
| 01           | (a)       | 1980-84      | 05         | 1.29             | 1.13         | 1.21         | 0.06 | 0.02 |
| 02           | (b)       | 1985-89      | 05         | 1.51             | 1.19         | 1.35         | 0.12 | 0.05 |
| 03           | (c)       | 1990-94      | 05         | 1.74             | 1.5          | 1.62         | 0.09 | 0.04 |
| 04           | (d)       | 1995-99      | 05         | 2.07             | 1.64         | 1.85         | 0.20 | 0.08 |
| 05           | (e)       | 2000-04      | 05         | 2.42             | 1.88         | 2.15         | 0.26 | 0.11 |
| 06           | (f)       | 2005-09      | 05         | 2.75             | 2.48         | 2.61         | 0.11 | 0.04 |
| 07           | (g)       | 2010-15      | 06         | 3.11             | 2.78         | 2.94         | 0.14 | 0.05 |
| <b>Total</b> |           |              |            | <b>14.89</b>     | <b>12.60</b> | <b>13.73</b> |      |      |

Source Bureau of Statistics and data analysis record of thesis of Basharat Mehmood M.Phi Economics AAU

**Table No.06 Showing the Mean Values of Agriculture related Trade Sector in Pakistan for Seven STPs w.e.f 1980-84 to 2011-2015.**

| Sr. No.      | Tenure No | Actual Years | Fre-quency | Trade Sector |              |              |      |      |
|--------------|-----------|--------------|------------|--------------|--------------|--------------|------|------|
|              |           |              |            | Max          | Min          | Mean         | SD   | SE   |
| 01           | (a)       | 1980-84      | 05         | 3.10         | 2.73         | 2.91         | 0.16 | 0.07 |
| 02           | (b)       | 1985-89      | 05         | 3.57         | 3.08         | 3.32         | 0.22 | 0.09 |
| 03           | (c)       | 1990-94      | 05         | 4.19         | 3.65         | 3.92         | 0.21 | 0.09 |
| 04           | (d)       | 1995-1999    | 05         | 5.24         | 4.69         | 4.96         | 0.23 | 0.10 |
| 05           | (e)       | 2000-2004    | 05         | 6.25         | 5.04         | 5.64         | 0.54 | 0.24 |
| 06           | (f)       | 2005-2009    | 05         | 8.63         | 6.39         | 7.51         | 0.83 | 0.37 |
| 07           | (g)       | 2010-2015    | 06         | 8.78         | 8.14         | 8.46         | 0.27 | 0.11 |
| <b>Total</b> |           |              |            | <b>39.76</b> | <b>33.72</b> | <b>36.72</b> |      |      |

Source: Bureau of Statistics and data analysis record of thesis of Basharat Mehmood M.Phil Economic

**Table No.07 Showing the Mean Values of GDP Growth with special reference to Agriculture Pakistan of Seven STPs w.e.f 1980-84 to 2011-2015.**

| Sr. No.      | Tenure No | Actual Years | Fre-quency | GDP Growth   |              |              |      |      |
|--------------|-----------|--------------|------------|--------------|--------------|--------------|------|------|
|              |           |              |            | Max          | Min          | Mean         | SD   | SE   |
| 01           | (a)       | 1980-84      | 05         | 10.21        | 5.06         | 7.63         | 1.91 | 0.85 |
| 02           | (b)       | 1985-89      | 05         | 7.62         | 4.95         | 6.28         | 1.20 | 0.53 |
| 03           | (c)       | 1990-94      | 05         | 7.70         | 1.75         | 4.72         | 2.16 | 0.96 |
| 04           | (d)       | 1995-1999    | 05         | 4.96         | 1.01         | 2.98         | 1.65 | 0.73 |
| 05           | (e)       | 2000-2004    | 05         | 7.36         | 1.98         | 4.67         | 2.01 | 0.90 |
| 06           | (f)       | 2005-2009    | 05         | 7.66         | 1.70         | 4.68         | 2.42 | 1.08 |
| 07           | (g)       | 2010-2015    | 06         | 4.71         | 1.60         | 3.15         | 1.24 | 0.50 |
| <b>Total</b> |           |              |            | <b>50.22</b> | <b>18.05</b> | <b>34.11</b> |      |      |

Source: Bureau of Statistics and data analysis record of thesis of Basharat Mehmood M.Phil Economics AAU, table 03, 06 and 07.



**Table No-08 Showing the Statistical Evidence of Stationary and E-Views 9 Results of data analyzed of informal Employment, Construction GDP, FDI, Trade and Transport Agriculture related for the period 1980-85 to 2015 .**

| Table –A                |       |                            |                            |
|-------------------------|-------|----------------------------|----------------------------|
| Variables               | Level | 1 <sup>st</sup> Difference | 2 <sup>nd</sup> Difference |
| Informal Employment (Y) | -     | I(1) Intercept             | -                          |
| Construction (CR)       | -     | I(1) Intercept             | -                          |
| GDP                     | -     | I(1) Intercept             | -                          |
| FDI                     | -     | I(1) Intercept             | -                          |
| Trade (TR)              | -     | I(1) Intercept             | -                          |
| Transport (TN)          | -     | I(1) Intercept             | -                          |

| Table-B                 |                      |            |           |
|-------------------------|----------------------|------------|-----------|
| Variables               | t-value              | Prob Value | Std Error |
| Informal Employment (Y) | 5.21>Critical Value  | 0.0002     | 0.18      |
| Construction (CR)       | 6.09>Critical Value  | 0.0000     | 0.17      |
| GDP                     | 7.47> Critical Value | 0.0000     | 0.16      |
| FDI                     | 3.81> Critical Value | 0.0064     | 0.16      |
| Trade (TR)              | 5.23> Critical Value | 0.0001     | 0.17      |
| Transport (TN)          | 5.62> Critical Value | 0.0001     | 0.39      |

Source: Thesis Data of Basharat Mehmood M.Phil Economics Student AAU.RWP

**Table No.09 Showing the Statistical evidence of results of Optimal lags Selection Criteria (AIC) of Seven Consecutive Periods w.e.f. 1980-84 to 2010-15 of CR, GDP, FDI, TN and TR Sectors respectively.**

| Lag | Log L     | LR        | FPE      | AIC       | SC        | HQ        |
|-----|-----------|-----------|----------|-----------|-----------|-----------|
| 0   | -240.4770 | NA        | 0.003824 | 17.13635  | 17.51353  | 17.25448  |
| 1   | -41.68631 | 274.1941* | 4.16e-07 | 7.840435  | 11.23510* | 8.903602  |
| 2   | 47.36554  | 73.69808  | 2.46e-07 | 6.112721* | 12.52487  | 8.120925* |

Source: WDR of respective years, Pak Economy Surveys Reports. Thesis Research Data analysis Basharat Mehmood, M.Phil (Economics) AAU Rawalpindi.

**Table No.10 Showing the results of Jarque Bara test and Probability values of Seven Consecutive periods w.e.f 1980-84 to 2010-15 of CR,GDP, FDI, TN and TR Sectors respectively.**

| Sectors                         | Skewness | Kurtosis | Jarque Bara Statistic | Probability Value |
|---------------------------------|----------|----------|-----------------------|-------------------|
| Construction (CR)               | 0.584589 | 2.407157 | 2.577662              | 0.275593>0.05     |
| Gross Domestic Product (GDP)    | 0.251866 | 2.602505 | 0.617620              | 0.734320>0.05     |
| Foreign Direct Investment (FDI) | 2.178259 | 7.062565 | 53.22551              | 0.0000<0.05       |
| Transport (TN)                  | 0.229774 | 1.653038 | 3.038238              | 0.218905>0.05     |
| Trade (TR)                      | 0.429698 | 1.834359 | 3.145919              | 0.207430>0.05     |

Source: WDR of respective years, Pak Economy Surveys Reports. Thesis Research Data analysis Basharat Mehmood, M.Phil (Economics) AAU Raw

**Table No.-11 Showing the results of (Long run) analysis of Auto regressive Distributive Lag (ARDL Bound Test) results of Seven Consecutive periods 1980-84 to 2010-15.**

| ARDL Bounds Test             |                 | Date: 08/05/17 Time: 04:35 |
|------------------------------|-----------------|----------------------------|
| Sample: 1980-2015            |                 | Included observations: 28  |
| Test Statistic               | Value           | K                          |
| F-statistic                  | 5.945661        | 5                          |
| <b>Critical Value Bounds</b> |                 |                            |
| <b>Significance</b>          | <b>I0 Bound</b> | <b>I1 Bound</b>            |
| 10%                          | 2.03            | 3.13                       |
| 5%                           | 2.32            | 3.5                        |
| 2.5%                         | 2.6             | 3.84                       |
| 1%                           | 2.96            | 4.26                       |

Source: WDR of respective years, Pak Economy Surveys Reports. Thesis Research Data analysis Basharat Mehmood, M.Phil (Economics) AAU Rawalpindi.

**Table No.-12 Showing Long run and Short Run results of ARDL on the basis of Bound Test of Seven Consecutive periods 1980-84 to 2010-15.**

|   |                            |
|---|----------------------------|
| ARDL Co-integrating And Long Run Form   | Dependent Variable: Y      |
| Selected Model: ARDL (3, 2, 2, 2, 2, 2) | Date: 08/05/17 Time: 04:38 |
| Sample: 1980 2015                       | Included observations: 28  |

#### COINTEGRATING FORM

| Variable    | Coefficient | Std. Error | t-Statistic | Prob.  |
|-------------|-------------|------------|-------------|--------|
| D(CR)       | 0.587835    | 0.273794   | 2.146993    | 0.1211 |
| D(CR(-1))   | -0.744351   | 0.210396   | -3.537855   | 0.0384 |
| D(FDI)      | 0.000290    | 0.000093   | 3.130662    | 0.0520 |
| D(FDI(-1))  | -0.000149   | 0.000049   | -3.036177   | 0.0560 |
| D(GDP)      | 1.351528    | 1.347358   | 1.003095    | 0.3897 |
| D(GDP(-1))  | 4.853998    | 2.861747   | 1.696166    | 0.1884 |
| D(TN)       | 1.272174    | 0.264689   | 4.806296    | 0.0171 |
| D(TN(-1))   | -1.357996   | 0.512001   | -2.652330   | 0.0768 |
| D(TR)       | 0.127153    | 0.140619   | 0.904239    | 0.4325 |
| D(TR(-1))   | -1.345673   | 0.286705   | -4.693582   | 0.0183 |
| CointEq(-1) | -3.380219   | 0.768059   | -4.400990   | 0.0218 |

**Cointeq** = Y - (0.3104\*AG + 0.7020\*CR + 0.0001\*FDI -1.8196\*GDP + 0.1933\*MM + 1.9694\*TN + 0.4050\*TR + 0.5941 )

#### LONG RUN COEFFICIENTS

| Variable | Coefficient | Std. Error | t-Statistic | Prob.  |
|----------|-------------|------------|-------------|--------|
| CR       | 0.701969    | 0.035323   | 19.872975   | 0.0003 |
| FDI      | 0.074       | 0.000011   | 6.562326    | 0.0072 |
| GDP      | -1.819559   | 1.111811   | -1.636573   | 0.2002 |
| TN       | 1.969355    | 0.106771   | 18.444646   | 0.0003 |
| TR       | 0.404984    | 0.027586   | 14.681019   | 0.0007 |
| C        | 0.594143    | 0.150401   | 3.950392    | 0.0289 |

Source : Thesis Research Data analysis Basharat Mehmood, M.Phil (Economics) AAU Rawalpindi.

**CONCLUSIONS:**

- i. The time series data of 1980 to 2015 (of 35 years) when splitted into tenure periods, of five yearly each, gave better and non-erronious results.
- ii. The inflow of FDI was regularly observed towards increase, as can be seen in seven -5 yearly splitted tenures periods except it was decreased in the last tenure (2011-2015).
- iii. Our statistical applications of ARDL gave significant impact of FDI on various sectors for Informal Employment.
- iv. The Informal Employment in Agriculture related Construction Sector (CR) in the seven tenures of a, b, c, d, e, f and g was consecutively towards increase w.e.f. 1980-85 through 2015.
- v. Agriculture Trade Sector (TD) was observed showing a successive increase towards Informal Employment utilizing FDI, throughout the study tenure of a, b, c, d, e, f and g with no decrease noticed.
- vi. There was also an increasing trend observed in Agricultural Transport (TN) Sector in utilizing FDI in all the tenure (a) through (g) without any decrease noticed.
- vii. The FDI inflow to Pakistan from various developed and friendly countries was splitted averaged in only three tenures of (a) 2000-2005, (b) 2006-2010 and (c) 2011-2015 to the tune of (a)= 1266.45, (b)= 3762.62 and (c) 1628.69 million USDs indicated our financial personnel avoiding total dependence on FDI and slowly on self reliance strategy.
- viii. Since the study was limited to general overall figers, the detailed Agricultural Sub-Sectors wise study, was yet needed, to be carried out.

**RECOMMENDATIONS:**

- a. FDI inflow from various developed and economically better countries, to Pakistan, provided good financial support in various sectors, hence be continued.
- b. The Informal Employment was observed in the improvements, hence other Sectors be included by Government Authorities.
- c. The time series data, w.e.f 1980-85 to 2015 and or 2016 may sometimes give negative impact hence 05 years Splitted Tenures Periods (STP) as we

devised in our study, may be implemented which is a positive approach, in time series data.

- d. Similar studies on the Agricultural sub-Sectors, specially in value addition of processed food, Fertilizer use, and Pest managements along with seed improvement are recommended to be carried out, in different parts of the country.
- e. It is recommended for Researchers, Planners, Teachers and Graduate Students that work on recent years say 03-04 years from today is much helpful rather than repeatedly putting on self for just an exercise.
- f. Statistical analysis using Stat Pack (2004), SAS-2006, E-Views 9 are equally effective and can be utilized in such time series data but in a splitted devised of 04-05 years tenures.

## REFERENCES:

- Ahmad, K. (2012). Determinants of Agriculture Productivity Growth in Pakistan. International Research. Journal of Finance and Economics. Issue 95 p.p. 336-345
- Ajmair, M. and Hussain, A. 2014. Impact of Foreign Direct Investment on Sectors of GDP Pakistan Perspective. International Journal of Science and Research (IJSR).ISSN (Online): 2319-7064.
- Amjad, Z. (2012). Informal employment and Foreign Direct Investment in Pakistan. International Journal of Sciences Basic and Applied Research (IJSBAR) and Economic Research doi:10.11648/jiber.2015.11 ISSN:2328-7543 (Print) ISSN 2328- 756X (Online).
- Bajwa, A. (2013). Pakistan Employment Trends (2013). Pakistan Bureau of Statistics, Government of Pakistan, Islamabad January 2014.
- Bilawal, M., M. Ibrahim. A. Abbas. M. Shuaib. M. Ahmed and I. Hussain (2014). Impact of Exchange Rate on Foreign Direct Investment in Pakistan. Advances in Economics and Business 2(6):223-231.
- Bildirici, M., Alp, E. A., & Kayikci, F. (2010). Effect of Foreign Direct Investment on Growth in Turkey. Growth & Development , 3B, p.p. 191-200.
- Byiers, B., F. Kratke. P.J. Warden. L.R. Takinchi and A.Wijesinha (2015). Manufacturing Progress Employment Creation in Sri Lanka. Case Study Report Sri Lanka.
- Chen, A.M. (2007). Rethinking the Informal Economy Linkages with the Formal Economy and the Formal Regulatory Environment. Economic and Social Affairs. DESA, Working Paper No.46 ST/ESA/2007/DWP/46.
- Doss, C. (2011). The role of women in Agriculture. ESA Working paper No. 11-02 March 2011.
- FAO (2010). National Gender Profile of Agricultural Households. Report based on the 2008 Cambodia Socio-Economic Survey. Food and Agriculture

- Organization of the United Nations, Rome and General Statistics Office and Ministry of Planning, Phnom Penh.
- Ghafoor, A., and Alam, A. (2015). Impact of Agriculture Productivity on Economic Growth: A case study of Pakistan. ISSN 2224-6096 (Paper) ISSN 2225-0581 (online) Vol 5, No.7.
- Gudaro, A.M., I.U. Chhapra and S.A.Sheikh. (2010). Impact on Foreign Direct Investment on Economic Growth: A Case Study of Pakistan. Journal of Management and Social Sciences Vol.6, No.2, p.p. 84-92.
- Hertz, T., P. Winters, A.P. De La O, E.J. Quinones, C. Azzari, B. Davis and A. Zezza. (2009). Wage Inequality in International perspective effects of location, sector, and gender. Paper Presented at the FAO-IFAD-ILO Workshop on gaps, trends and current research in gender dimension of agricultural and rural employment: differentiated pathways out of poverty Rome, 31 March, FAO, Italy.
- Hussain, M.E. & Haque,M. (2016). Foreign Direct Investment, Trade and Economic Growth: An Empirical Analysis of Bangladesh. Economics 2016, 4,7; doi: 10, 3390/ economics 4020007. [www.mdpi.com/journal/economics](http://www.mdpi.com/journal/economics)
- Isran, S. and M.A. Isran. (2012). Low Female Labor Participation in Pakistan. Pakistan Journal of Social Sciences (PJSS),Vol.32, No.2 (2012), pp.453-468.
- Karlsson, S., N. Lundin. F. Sjöholm and H. Ping. 2009. Foreign Firms and Chinese Employment. Research Institute of Industrial Economics. IFN, Working Paper No.723, 2007.
- Kawaguchi, D. 2008. Self-Employment Rents: Evidence from Job Satisfaction Scores. Hitotsubashi Journal of Economics 49 (2008), pp.35-45.
- Kumar,S. 2014. Foreign Direct Investment in Indian Agriculture Sector: Opportunities and Challenges States. w.w.w. Indiatat.com October-November,2014.
- Muhammad Hafeez and Mashook Ali Bhutto (2013). Increased Livestock Production to the year 2030, Pak. JLSc-Vol-(VI) No.06 p.p. 263-271.
- Ramzan, M., M. Asif and M. Mustafa. (2013). Impact of trade openness and macroeconomic variables on GDP growth of Pakistan. A Research Journal of Commerce, Economic and Social Sciences, Vol.7.No.1, pp.32-41.
- Rizvi, S. Z. A. and M. Nishat (2009). The impact of Foreign Direct Investment on Employment opportunities. Panel Data Analysis Empirical evidence from Pakistan, India and China.
- Shafiq Qadir Memon, Farhatullah Sartaj Khan and Muhammad Hafeez (2016). Increased Agricultural Production to the year 2030 and beyond Pak.JLSc. Vol-VIII, No.08, p.p.625-632.

## THE POSITIVE IMPACT OF AGRICULTURE AND LIVESTOCK COURSES ON THE MATRIC AND FA STUDENTS, BASED ON PAPER EVALUATION OF AIOU, ISLAMABAD

Bushra Tabassum<sup>1</sup>, Kaleemullah<sup>2</sup> and Muhammad Hafeez<sup>3</sup>

### ABSTRACT

This endeavour pertains to two sustained efforts of paper-evaluation a total of 22766 (transcripts evaluated) of Matric course codes No 211, 253, 254, 256 and 257=4130) and FA code course No.313, 326, 327, 328, 329, 342 and 349, 7125 totalling 11255 (including 49 scripts as self evaluated), carried out by the Agriculture panel ID No.3012, and for Spring semester ID No.3168 and Autumn 2017 respectively. The second effort was done for the matric and FA same course codes for Autumn semester-2017 for answer scripts evaluated to the tune of 4214 (Matric) and 6048 (FA) totaling 10311. The comparative Net enrollment (NE) appeared increasing significantly (P<0.01) Agriculture and Livestock showed a positive impact of courses, opted by these students (of Matric and FA level) without any student orientation and/or counseling, from different parts of the country, with bare confidence on distant learning of education by the younger generation of the Country. This effort is a real outcome of continuous paper evaluation panel of Agriculture and livestock, since two decades, at AIOU, Islamabad (with varying number of 05-07 S/Es supervised by one H/E).

**Keywords:** Students option Matric-FA Agriculture and Livestock Courses, Distant Learning, Script Evaluation, AIOU, Islamabad.

Article Received: September-2018 Accepted: October-2018 Published: December-2018

### INTRODUCTION:

The Department of Agricultural Sciences of Allama Iqbal Open University (AIOU), Islamabad started offering optional courses at Matric (211-Poultry Sciences, 219 Agriculture basic course, 253-Livestock Management and 254 Livestock Production) with 256 Agriculture and 257 Vegetable Production while at FA level course such as code-313 Dairy Farming, 326 Jadeed Zarai Umoor, 327-Agricultural Farm Machinery and Equipment, 328-Oilseed crops, 329-Agriculture Fruit Farming Horticulture, 342-Gardening/Baghbani and 344-Plant Protection for distant learning students. Regular paper evaluation (Semester's final examination answer script evaluation) was continuously being done by the Agriculture and Livestock panel (with each semesters different ID) and work entrusted to this team was timely completed, with the blessing of Almighty Allah.

This academic cum investigative effort provides the possible Net Enrollment

<sup>1</sup>Research Fellow, Ph.D. Scholar, AAU, RWP.

<sup>2</sup>Research Assistant, Livestock Management, DAS, AIOU, Islamabad.

<sup>3</sup>President LDF, Islamabad.



(NE) of Agriculture and Livestock courses (both at Matric and FA levels) with a comparative analytical approach of both semesters, Autumn and Spring 2017, statistically evidenced by the determinants of various codes and total quantum of papers. As evaluation understood, the Actual Net Enrolment (NE) had always been different, (sometimes, as recorded in the previous two decades) to the fact that at least 04-05% students either do not appear in the examinations (even enrolled) or remain absent in the overall lists of NE and appearing in the examination (obtained from the Admission Section and the Examination Section of AIOU). Moreso sometimes the students are not allowed to sit in the examination (without proper identification or impersonation cases etc) as well as some students remain subjected to Un-Fair Means (UFM) in such cases.

In the previous similar efforts by the Agriculture and Livestock panel sustainable trends of influx of Matric and FA students in Agriculture and Livestock subject in AIOU were documented by Iram Shahzadi et.al. (2016) in which paper evaluation/Answer Script evaluation consulted totaling 11454 scripts was compared in two semesters namely 2013-14 and 2015-16 (for two semesters each of Spring and Autumn of these years and data presented. Yet another similar endeavor pertained to the two semester paper evaluation of spring and autumn 2013-14 and 2014-15 respectively under the caption titled as “observation of interest of matric and FA students in Agriculture and Livestock Courses” documented by Iram Shahzadi et.al (2015) in which three semester’s total scripts evaluated were 10147, 12698 and 13313 for three semesters, in that study.

## **MATERIAL AND METHODS:**

The methodology was adopted as under:

### **A. Population:**

- (i) Total number of answer scripts of the two recent semester were taken as population  $N_1=11255$  and  $N_2=11511$  for Autumn and Spring Semesters 2017 respectively.
- (ii) The different codes of matric and FA Autumn-2017 and Spring 2017 were recorded separately as out of 06 codes (4130) and out of 05 (4214) for the two semester.



- (iii) The total answer scripts evaluated were recorded separately as from 07 codes each for FA Autumn Semester-2017 (5308) and (6048) for spring semester 2017 respectively.

## B. Date Collected (Sampling)

- (i) The code wise scripts evaluated were recorded for Matric codes 211, 253, 256 and 257 for Autumn 2017 as well as
- (ii) For Spring semester-2018
- (iii) Simultaneously all the 07 codes of FA were recorded separately for Autumn-2017 and
- (iv) Total answer scripts evaluated for each of the seven (07) courses codes were also recorded separately for Spring semester-2017.
- (v) Statistical Analysis

The data collected for two semesters for different five course codes of matric and Seven course codes of FA were subjected to proper statistical analysis, using Excel and Analysis of Variance (ANOVA) with the help of Stat-Pak-SPSS-07 together with E-Views-09 and subjected to "T" test for significance at  $P < 0.001$  to  $P < 0.05\%$  level of probability.

- (vi) Interpretation of Results

The result obtained for each semester, properly analyzed have been presented in the results in tabulated forms.

**Table No.1 showing answer scripts evaluated for Matric and FA students agriculture subjects, Aut.2017, AIOU, Islamabad**  
**Autumn 2017**

| Matric       |      |                                   |       | FA         |      |         |       |
|--------------|------|-----------------------------------|-------|------------|------|---------|-------|
|              | Code | Bndle                             | Total |            | Code | Bndle   | Total |
| A            | 211  | 03                                | 1451  | B          | 313  | 03      | 591   |
|              | 219  | 01                                | 169   |            | 326  | 04      | 428   |
|              | 253  | 03                                | 860   |            | 327  | 01      | 277   |
|              | 254  | 03                                | 740   |            | 328  | 04      | 680   |
|              | 256  | 04                                | 907   |            | 329  | 06      | 1226  |
|              | 257  | 05                                | 1003  |            | 342  | 05      | 1119  |
| Sub. Total   | 06   | 19                                | 4130  | Sub. Total | 349  | 05      | 987   |
|              | C    | Outside                           | NIL   |            | C    | Outside | 1780  |
|              | D    | Self                              | NIL   |            | D    | Self    | 37    |
| Grand Total: |      | A+B+C+D = 4130+5308+1780+37+11255 |       |            |      |         |       |

Source: H/E record of Agriculture and Livestock Panel of these semesters

**Table No.2 showing answer scripts evaluated for Matric and FA students agriculture subjects, Aut.2017, AIU, Islamabad Spring 2017**

| Spring 2017                                     |         |       |       |            |      |       |       |
|---|---------|-------|-------|------------|------|-------|-------|
| Matric  |         |       |       | FA         |      |       |       |
|   | Code    | Bndle | Total |            | Code | Bndle | Total |
| A   | 211     | 02    | 311   | B          | 313  | 04    | 912   |
|   | 219     | NIL   | NIL   |            | 326  | 04    | 569   |
|   | 253     | 01    | 240   |            | 327  | 04    | 594   |
|   | 254     | 02    | 311   |            | 328  | 04    | 822   |
|   | 256     | 05    | 982   |            | 329  | 05    | 586   |
|   | 257     | 10    | 2470  |            | 342  | 04    | 2681  |
| Sub. Total                                      | 06      | 20    | 4214  | Sub. Total | 349  | 10    | 6048  |
| C   | Outside | NIL   | C     | Out side   | 1200 |       |       |
| D   | Self    | NIL   | D     | Self       | 49   |       |       |
| Grand Total: A+B+C+D = 4214+6048+1200+49= 11511 |         |       |       |            |      |       |       |

Source: H/E record of Agriculture and Livestock Panel of these semesters.

## RESULTS:

1. A total of 22766 answer scripts were evaluated (checked for marks obtained) in both the semesters of this study comprising 11255 for Autumn 2017 and 11511 for Spring 2017 semesters which showed an increase of 256 scripts with an increase of 2.27% in overall both the semesters quantum of those students, out of NE and took the examination.
2. A total of 011 codes were offered (06 in Autumn and 05 in spring semester) in 2017, at Matric level with total number of bundles as 19 and 20 showing the recorded (evaluated) scripts as 4130 and 4214 respectively with an apparent increase of 84 (2.03%) in Matric students (as reflected in table No.01).
3. A total of 14 codes were offered (07 each in Autumn and Spring semester-2017, with the total quantum of answer scripts evaluated were 7125 and 7297 for the two semesters of this study with an apparent increase of 172 (2.41%), as detailed in table No.02.
4. Statistical Analysis  
The data of the two semesters, of this study, was subjected to Excel, Analysis of Variance (ANOVA), using Stat-PACK-SPSS (2017) as well as E-Views 09 and comparative approach was adopted for correlations and it was found that increasing number of NE and examination taken by Matric

and FA students showed a positive impact significantly  $P < 0.01$  to  $P < 0.05$  level of probability using “T” test, as appear in table No.3.

### **BRIEF DISCUSSION:**

Non-Formal Education (NFE) and Distance Learning System (DLS) had shouldered the responsibility of Increasing NE at Matric and FA levels; by Allama Iqbal Open University (AIOU) since 1986 which is now being advocated as Education For All (EFA) proposed at UNICEF (2011) and (2015) in AIOU-2016-17 as documented in AIOU progress report, in the light of Education Policy-2009 (GOP-2010) and provincial approaches, after the 18<sup>th</sup> constitutional amendment, duly documented by Allah Bakhsh Malik (2015).

There are at least 172 different panels, of paper evaluation, of various subjects, evaluating answer scripts for 258 Matric codes, 340 FA codes, 140 BA/BSc/B.Com, BLS, BMAS.Com and Darse-Nizami including CT & PTC for 01-02 months continuous hard work, daily. There is no leave even on Saturdays and Sundays and this paper evaluation work shoulders one million plus students NE and who take examination, year after year.

Agriculture and Livestock panel, like wise evaluated not less than one tenth 1/10<sup>th</sup> of the total strength of NE at Matric and FA level, and the specific research oriented approach of H/E, Muhammad Hafeez et.al (2010-11), (2011-12) and even earlier, documented elsewhere, in the light of enlightened moto of strict vigilance and confidential work, also a document such work for information and benefit of the researchers and per guidelines of AIOU (Controller of Examinations 2010-2011 and 2008-09).

Although the remuneration per answer script for Sub. Examiners (S/E) and Head Examiners (H/E) is not at par with the Federal Board of BISE (2008-09) (2009-10) as well as Rawalpindi RWP-Board (2007-08) and (2008-09) with the recent enhancement of Rs.2/- and Rs.4/- per answer script for Matric and FA has somewhat attracted the examiners both S/Es and H/Es but still it needs to be increased, for better output and quality evaluation.

**CONCLUSIONS:**

Based on two semester's paper evaluation work (answer scripts checking for marks obtained), the following conclusions are out coming:

- (i) The number of candidates who appeared in the final examinations after being enrolled, was increasing, sustainably
- (ii) It has also been concluded that the increase in number of students of both Matric and FA has positive impact on the enrollment of these students without students orientation or students counseling.
- (iii) The quantum of work in each course code of Matric and FA showed mixed trend of increase in forms of No. of bundles and No. of answer scripts, in the two semester.

**RECOMMENDATIONS:**

It is suggestively recommended that regional campuses of AIOU start students counseling periodically going into schools and finding drop out (tracing) from matric and FA be given orientation towards Matric and FA programs specially in Agriculture and Livestock courses.

**REFERENCES:**

- Ejaz Wasti (2017-18). Net enrollment of Primary, Middle, Secondary and Higher Secondary Schools, education Pak. Economic Survey Report, Economic Advisersy Wing, Ministry of Finance, GOP, Islamabad p.p.153-163.
- Iram Shahzadi, Memoona Khan, Bilal Mansoor and Muhammad hafeez (2015). Observations of matric and FA students in agriculture and livestock subjects as reealed though papers evaluation. Pak.JLSc, Vol-VII, No.07-60, p.p. 543-551.
- Iram Shahzadi, Saima bibi, M. Ibrahim and kaleemullah (2016) students in Agriculture and Livestock subjects in spring and autumn semesters of AIOU, Islamabad. Pak. JLSc, Vol-VIII, NO.08, 69, p.p.609-613.
- Muhammad Hafeez, Tabinda Khawaja, Fahad karim, Bilal Mansoor, M. Ibrahim and Iram Shahzadi (2012). Increasing trend of Enrolment of Matric and FA students in Agriculture and Livestock subjects at AIOU, Islamabad, as observed through paper evaluation our semesters. Pak.JLSc, Vol-IV, No.04, p.p.255-264.
- Allah Bakhsh Malik (2015). Education for all (EFA). Review Report Pakistan, Ministry of Education, Training and Standards in Higher Education Academy of Educational Planning and Management, Islamabad Pakistan p.p.01-43.
- GOP (2009). Education Policy, targets for achieving Millenium Development Goals (MDG) and sustainable Development Goals (SDG) towards increased enrollment at Matric and Higher Secondary level towards Education for All (EFA), Government of Pakistan, Ministry of Education, Islamabad .

## A COMPARATIVE STUDY OF MARKS OBTAINED BY FA STUDENTS IN ASSIGNMENTS OF AGRICULTURE COURSE CODE 349 FOR SPRING-2018 SEMESTER, RAWALPINDI REGION, AIOU, ISLAMABAD

Uzama Kanwal<sup>1</sup>, Nadia Hafeez<sup>2</sup> and Muhammad Hafeez<sup>3</sup>

### ABSTRACT

A total of 59 student's both assignments I and II (118) were compared, splitting the students, at random, based on Roll Number (Roll No.) categories of (i) BA, BC, BD, AT and AY category with 10 students (ii) BB with 07 students, (iii) BC- with 10 students, (iv) BD with 12 students, (v) BE and BF with 13 students, (vi) BH, K and M category Roll No. with 07 students, five of the students renamed absentees in both assignments I and II hence N 118 assignments with I and II were involved in this study, these six categories of students (i to vi) were designated as groups (G), G-1, G-2, G-3, G-4, G-5 and G-6. These groups of students obtained cumulative marks as G-1 mean marks of 139.5 (with range of max: 151 and min: 125) 70.7 and 68.8 in Assignments I and II respectively. G-2 obtained 121.29 (with the range of max: 156 and min: 133), G-3 obtained 142.2 marks cumulatively (with max: 158 and min: 125) while G-4 obtained averaged 150.83 marks (with max: 155 and min: 132 marks). Likewise G-5 obtained cumulative averaged marks as 141 (with the range of max: 154 and min: 119) and G-6 obtained cumulative averaged marks as 141.43 (with the range of max: 151 and min: 134 marks) respectively. The statistical analysis evidenced that group variances did not affect marks obtained by each category significantly  $P < 0.002$  to  $P < 0.001\%$  level of determinants of (i) intra and (ii) inter-group analysis. The absentees were recorded in females (girl students). This study concluded that there appeared no. much difference in the cumulative marks obtained but differences were recorded in the individual groups when assignments I and II were compared but to lesser extent. Similar studies were recommended to be carried out in various tehsils of Rawalpindi Region, in different course codes for improvement.

**Key Words:** Critical evaluation of students assignments, FA agriculture, course code 349, AIOU, Islamabad Pakistan.

Article Received: October-2018 Accepted: November-2018 Published: December-2018

### INTRODUCTION:

More than 178 tutors of Matric and FA programs are assigned various course codes students, for evaluating Tutorial Assignments, in Rawalpindi (RWP) and Islamabad (ISBD) Regions of AIOU, since 1986. The tutorship awarded to subject specialists in Agriculture code 219 253 and 254 at Matric and Livestock Course codes 211, 253 and 254 at Matric while at FA course codes 313 pertain to Livestock whereas in Agriculture courses codes 326, 327, 328, 329, 342 and 349. The students of these courses are allotted to tutors for evaluation (marking) and critically guiding the students (on each assignment-I and II) for improvement. This comparative study, endeavored for the first time, to find out students efforts in

<sup>1</sup> Research Fellow, M.Phil (Edu), AIOU, Islamabad.

<sup>2</sup> Research Fellow, M.Phil (Edu), AIOU, Islamabad.

<sup>3</sup> Ex-Consultant, DAS and Tutor, AIOU, Islamabad.

obtaining marks on their assignment No. I and II in the Agriculture course codes 349, for a single semester, with academic and statistical analysis.

The paper evaluation (answer script) for marks obtained as well as tutorial assignments I and II (sometimes there are the four assignments such as code 411-BA, I, II, III & IV). These assignments are responsibility of properly qualified examiners and registered tutors. (subject specialist). This whole work was shouldered by one of the authors of this write-up, being regd. Tutor, for the last 15 years, such analytical evaluation based on statistical methods, was never endeavored, as tutors have no time in getting involved in such critical analysis. Both the first two authors, being research fellows at M.Phil (Edu), at AIOU currently involved (2017-18) got involved in analytical approach of this study.

Paper evaluation and assignment evaluation is not only carried out, at home but in other developing as well as developed countries, for a quick and timely assessment of student's academic achievements. Such as Uzma Kanwal et.al (2013-14), Khizar hayat et.al (2014), Muhammad Hafeez et.al (2012), Iram Shahzadi et.al (2015-a) and Iram Shahzadi et.al (2016-b) in the light of GoP, Millenium Development Goats (MDGs) (2012-13) and sustainable Department Goals (SDGs) 2016-17, as documented by Ejaz Wasti (2016-17-a) and Ejaz Wasti (2017-18-b) towards the National and International Commitments of Education For All (EFA), as advocated at various forums for a duly supported document by Allah Bukhsh Malik (2015) in the light of GoP Education Policy 2009 as well as critically evaluated Punjab Education System (PES) of Punjab government by Tahira Bibi (2015) and by GoP, Ministry of Education, achieving maximum possible the National Targets, under the "Vision-Pakistan" (2025).

After the 18<sup>th</sup> amendment of the constitution of Pakistan, Article 25-A also warrants the improvement in educational status of the country at Matric and FA levels for Net enrollments (NE), reducing the drop outs at each level in school (Primary, Middle, Secondary and Higher Secondary) for better education in the country.

Workers from abroad have also reported similar positive approaches in students evaluation for their academic achievements such as from Kenya by

Jacob Merew et.al (2015) and from other countable researchers, for better education in the future generation of their countries.

#### **MATERIAL AND METHODS:**

- (i) The number of both the assignments I and II were taken as N=118, population of the study.
- (ii) Both assignment I and II numbering n1 -59 and n2-59 were regarded the two categories.
- (iii) Students assignments were splitted into six categories (i), (ii), (iii), (iv), (v), and (vi) for split of data into convenient study groups (G-I, G-2, G-3, G-4, G-5 and G-6 respectively.
- (iv) Determinants of (a) by the students in individual assignments I and II and (b) cumulative marks in groups were subjected to evaluation, in this study.
- (v) All the data collected from the results sheets, before submission to the Regional Directorate, were subjected to proper statistical analysis, using Stat-Pack-SPSS-2007, and E-view-09, towards finding the significance affects of assignments I and II on the group evaluated marks obtained as well as group cumulative marks on the students performance of this study.
- (vi) Strict Secrecy was observed, at all steps.

The results, obtained have been presented in tabulated form, in the results section, of this write-up.

#### **RESULTS:**

01. The total number of assignments of students I-59 and II=59 together totaling N1=118, when splitted in groups (i) through (vi) were 10, 07, 10, 12, 13 and 07 student in each group hence 20, 14, 20, 24, 26 and 14 assignemnts were involved for individual marks obtained as well as cumulative, as given below:

##### **(i) Marks Obtained by (Group-I)**

This group (g-1) comprised 10 students and the marks obtained in assignment means numbers came to  $70.7 \pm 2.7$  (with the range of



max: 76 and min 60) while in assignment No.II the marks obtained gave mean number of  $68.8 \pm 1.8$  (with the range of max: 73 and min 61 marks. Simultaneously the cumulative marks obtained by this group-1 gave a mean number of  $139.5 \pm 2.33$  (with the range of max: 151 and min: 130 respectively as presented in table No.01.

**(ii) Marks Obtained by (Group-II)**

This group comprised of seven (7) students and in assignment-I the marks obtained showed mean number of  $71.71 \pm 11.14$  (with the range of max:82 and min:60 marks) while in assignment-II the marks obtained by this groups reflected a mean number of  $70.28 \pm 8.66$  (with the range of max: 76 and min:61) Likewise the cumulative marks obtained by this group showed mean number of  $121.29 \pm 23.21$  (with the range of max: 156 and min: 133 marks) respectively as detailed in table No.2.

**(iii) Marks Obtained by (Group-III)**

This group consisted of 10 students and in their 1<sup>st</sup> assignment these students obtained marks mean numbered as  $71.6 \pm 11.5$  (with the range of max: 83 and min: 60 marks) while in their second assignment they obtained mean marks as  $70.6 \pm 8.5$  (with the range of max: 80 and min: 63 marks). The cumulative marks obtained however gave a mean value of  $142.2 \pm 11.5$  (with the range of max: 158 and min: 125 marks) as appear in table No.3.

**(iv) Marks Obtained by (Group-IV)**

This group-IV comprised of 12 students hence 24 assignment (12 each I and II) were evaluated/marked and returned to students. The First assignment showed mean marks of  $79.25 \pm 6.5$  (with the range of max: 80 and min: 67 marks) while the assignment No. II results showed 78.09 marks obtained  $\pm 7.5$  (with the range of max: 79 and min: 64 marks). The cumulative marks however revealed a mean number of  $150.83 \pm 11.5$  (with the range of max: 155 and min: 132) respectively as laid down in table No.4.

**(v) Marks Obtained by (Group-V)**

This group comprised of 13 students and hence 26 assignments (I and II) were evaluated and returned to students. These students obtained mean marks of  $73 \pm 15.15$  (with the arrange of max: 83 and min: 53 marks while the Second assignment's mean marks were  $68 \pm 12.9$  (with the range of max: 76 and min: 52 marks). The cumulative marks obtained by the 13 student revealed mean marks of  $141 \pm 15.55$  (with the range of max: 159 and min: 129) as detailed in table No.5.

**(vi) Marks Obtained by (Group-VI)**

This group comprised of seven (7) students and their averaged mean marks recorded were  $70.29 \pm 3.33$  (with the range of max: 80 and min: 65) and in their second assignment, the marks obtained mean numbered  $71.14 \pm 5.45$  (with the range of max: 76 and min: 66) while the cumulative marks obtained by these students showed mean value of  $141.43 \pm 8.5$  (with the range of max: 151 and min: 134 marks) respectively as presented in table No.6.

**02. Statistical Evidence**

The data when subjected to Excel Analysis of Variance (ANOVA), using Stat-Pak-SPSS-2007 and E-View-09, it revealed that there was positive impact ( $P < 0.001\%$ ) of marks both in assignments I and II on all the six groups of this code (349-Agriculture) with a larger percentage of securing good marks, both in individual assignments I and II as well as in cumulative marks obtained by these group students, as presented in table No.7.

**03. Absentees**

A total of 06 females (girls) students remained absent (in both the assignments I and II) out of a total of 65 (9.23%) which in matter of investigation as to why these FA students could not send even a single assignment.

### **BRIEF DISCUSSION:**

The response of submitting assignments I and II was variable, although students get more than one to one and half months' period for both the assignments. Tutorship duty is allotted to tutors on 30<sup>th</sup> December and 30<sup>th</sup> June each semester in response to Admission offered in August September and February March respectively, as a routine, hence assignments received by tutors (as in this case also) are evaluated, marks awarded and returned to students with one month time. Simultaneously the second assignment starts pouring in and is evaluated accordingly, returned with marks, awarded and with some guidance of corrections, improvements and appreciation of good assignments. Absent students always remain either sleeping or about with lame excuses, anyhow, this is a subject of further investigation. As for example, the question of "dropout" is circulating among academicians at Primary, Middle, Secondary as well as Higher Secondary levels in the country, as documented by Farooq and Kai (2016), Tran Thu Ha and Trudy Harpham (2015) from Vietnam, Khizar hayar et.al (2013) form Pakistan, Noreen Mujahid and Muhammad Noman (2015) form Sindh Pakistan, Muhammad Imran (2010) Pakistan, Muhammad Sohail Farooq and Yuan Tong kai (2016), Pakistan, on quality improvement perspective and Basharat Mehmood et.al (2016) on Education Economics, as well as Jacob Merew Katermei and Goion Omwono (2015) from Kenya on Academic Improvements of students.

In this study, as a matter of fact the tutor has awarded the students assignments with majority percentage above 70% marks and to the less percentage as 55 to 60%, (depended on the nicely written assignments), with patronizing attitude and encouraging behavior, if prevailed on sustainable basis, the students will be satisfied with their efforts. This will be in line with the EFA Slogam in Education sector, duly advocated by workers at home and abroad referred to above.

**Table No.1 showing marks obtained in assignments I and II in Spring semester in agriculture code 349, AIOU, Islamabad**

| Sr.# | R.No. Serial | Marks-I     | Marks-II    |          | Cumulative   |
|------|--------------|-------------|-------------|----------|--------------|
| 01   | BA           | 72          | 71          | =        | 143          |
| 02   | BC           | 73          | 73          | =        | 146          |
| 03   |              | 76          | 75          | =        | 151          |
| 04   |              | 60          | 65          | =        | 125          |
| 05   | BD           | 68          | 64          | =        | 132          |
| 06   |              | 76          | 71          | =        | 147          |
| 07   |              | 67          | 73          | =        | 140          |
| 08   | BG           | 73          | 61          | =        | 134          |
| 09   | AT           | 68          | 62          | =        | 130          |
| 10   | AY           | 74          | 73          | =        | 147          |
|      | <b>Mean</b>  | <b>70.7</b> | <b>68.8</b> | <b>=</b> | <b>169.5</b> |

Source: The tutor record of AIOU, Islamabad

**Table No.2 showing marks obtained in assignments I and II in spring semester in agriculture code 349, AIOU, Islamabad**

| Sr.# | R.No. Serial | Marks-I      | Marks-II     |          | Cumulative    |
|------|--------------|--------------|--------------|----------|---------------|
| 01   | BB           | 76           | 69           | =        | 145           |
| 02   |              | 82           | 74           | =        | 156           |
| 03   |              | 60           | 73           | =        | 133           |
| 04   |              | 71           | 70           | =        | 141           |
| 05   |              | 75           | 61           | =        | 135           |
| 06   |              | 66           | 70           | =        | 136           |
| 07   |              | 72           | 76           | =        | 148           |
|      | <b>Mean</b>  | <b>71.71</b> | <b>70.28</b> | <b>=</b> | <b>121.29</b> |

Source: The tutor record of AIOU, Islamabad

**Table No.3 showing marks obtained in assignments I and II in spring semester in agriculture code 349, AIOU, Islamabad**

| Sr.# | R.No. Serial | Marks-I     | Marks-II    |          | Cumulative   |
|------|--------------|-------------|-------------|----------|--------------|
| 01   | BC           | 70          | 72          | =        | 142          |
| 02   |              | 74          | 69          | =        | 143          |
| 03   |              | 83          | 63          | =        | 146          |
| 04   |              | 78          | 80          | =        | 158          |
| 05   |              | 73          | 77          | =        | 150          |
| 06   |              | 68          | 66          | =        | 134          |
| 07   |              | 72          | 76          | =        | 148          |
| 08   |              | 76          | 72          | =        | 148          |
| 09   |              | 60          | 65          | =        | 12           |
| 10   |              | 62          | 66          | =        | 128          |
|      | <b>Mean</b>  | <b>71.6</b> | <b>70.6</b> | <b>=</b> | <b>142.2</b> |

Source: The tutor record of AIOU, Islamabad

**Table No.4 showing marks obtained in assignments I and II in spring semester in agriculture code 349, AIOU, Islamabad**

| Sr.# | R.Nos. Serial | Marks-I      | Marks-II     |          | Cumulative    |
|------|---------------|--------------|--------------|----------|---------------|
| 01   | BD            | 73           | 73           | =        | 146           |
| 02   | G-I           | 68           | 64           | =        | 132           |
| 03   |               | 67           | 71           | =        | 138           |
| 04   |               | 80           | .            | =        | 80            |
| 05   |               | 73           | 79           | =        | 152           |
| 06   |               | 71           | 74           | =        | 145           |
| 07   |               | 76           | 75           | =        | 151           |
| 08   |               | 71           | 64           | =        | 135           |
| 09   |               | 74           | 72           | =        | 146           |
| 10   |               | 78           | 77           | =        | 155           |
| 11   |               | 72           | 66           | =        | 138           |
| 12   |               | 74           | 75           | =        | 149           |
| 13   |               | 74           | 69           | =        | 143           |
|      | <b>Mean</b>   | <b>79.25</b> | <b>98.09</b> | <b>=</b> | <b>150.83</b> |

Source: The tutor record of AIOU, Islamabad.

**Table No.5 showing marks obtained in assignments I & II in spring semester in agriculture code 349, AIOU, Islamabad**

| Sr.# | R.No. Serial | Marks-I | Marks-II |   | Cumulative |
|------|--------------|---------|----------|---|------------|
| 01   | BE           | 76      | 52       | = | 128        |
| 02   | G-II         | 53      | 66       | = | 119        |
| 03   |              | 71      | 64       | = | 135        |
| 04   |              | 53      | 75       | = | 137        |
| 05   | BF           | 73      | 70       | = | 143        |
| 06   | G-III        | 80      | 65       | = | 145        |
| 07   |              | 75      | 60       | = | 135        |
| 08   |              | 78      | 73       | = | 151        |
| 09   |              | 73      | 72       | = | 155        |
| 10   |              | 67      | 71       | = | 138        |
| 11   |              | 74      | 67       | = | 141        |
| 12   |              | 83      | 76       | = | 159        |
| 13   |              | 74      | 73       | = | 147        |
|      | <b>Mean</b>  |         |          |   |            |

Source: The tutor record of AIOU, Islamabad.

**Table No.6 showing marks obtained in assignments I and II in spring semester in agriculture code 349, AIOU, Islamabad**

| Sr.# | R.No. Serial | Marks-I      | Marks-II     |          | Cumulative    |
|------|--------------|--------------|--------------|----------|---------------|
| 01   | BG           | 68           | 66           | =        | 134           |
| 02   | G-IV         | 80           | 71           | =        | 151           |
| 03   |              | 74           | 76           | =        | 150           |
| 04   | BH           | 65           | 73           | =        | 138           |
| 05   | G-V          | 68           | 72           | =        | 140           |
| 06   | K (G-VI)     | 67           | 68           | =        | 135           |
| 07   | M (G-VI)     | 70           | 72           | =        | 142           |
|      | <b>Mean</b>  | <b>70.29</b> | <b>71.14</b> | <b>=</b> | <b>141.43</b> |

Source: The tutor record of AIOU, Islamabad.

### CONCLUSION:

1. This study revealed a positive response of students and their interest in Agriculture course code-349, at FA level, in AIOU, Islamabad.
2. Only six students absentees, in one semester, in one course code, in Rawalpindi region is far better, in distant learning approach of AIOU, in the country.
3. Ninety percent response of submitting assignments, (both I and II and getting more than 70% marks in each with majority percentage in submitting positive and to the point reply

### RECOMMENDATIONS:

1. It is suggestively recommended that quality of education can only be achieved when teachers/tutors evaluate students on their performance, evidenced through the assignments.
2. A strategy must be adopted, even in distant learning and assignments evaluation, by tutors when results are subjected to research oriented approach, at random, for any semester and thus the outcomes (of results) brought to the notice of higher authorities for improvement.
3. Students counselling, immediate after enrollment, at different tehsil levels such as (Seven Tehsils of Rawalpindi Region) or at AIOU HQs for tutorial meetings be made obligatory after 1<sup>st</sup> assignment results, towards improvement and quality education.

### REFERENCES:

- Uzma Kanwal, Aimen Ajaz; Nadia Hafeez and Muhammad Hafeez (2012). The growing prospects of private schools and colleges systems in rural areas of ICT, Islamabad. Pak.JLSc, Vol(IV), No.4-35, p.p. 285-294.
- Khizar Hayat, Muhammad Hafeez, Iram Shahzadi and Fazal-ur-Rehman (2013). Review of Teaches Training manual (TTM-Vol-I) for teachers of Primary Elementary and Secondary Schools, in Pakistan. Pak.JLSc, Vol-V, No.5 p.p. 256-268.
- Iram Shahzadi; Memona khan; Bilal Mansoor, Saima Bibi and Muhammad Hafeez (2015). Observation of interest of matric and FA students in Agriculture and Livestock subjects, as revealed through paper evaluation. Pak.JLSc, Vol-VII, No.7-60, p.p. 543-51.
- Muhammad Hafeez, Tabinda Khawaja, Fahad Karim, Bilal mansoor, Muhammad Ibrahim and Iram Shahzadi (2012). Increasing trends of enrollment of Matric and FA students in Agriculture and Livestock subjects in AIOU, as observed

- through paper evaluation of four semesters. Pak.JLSc, Vol-IV, No.4, p.p. 255-264.
- Ejaz Wasti (2016-17). Net enrollment at Secondary and Higher Secondary level in the country. Education sector of Pakistan. Pak. Economic Survey Report. Economic Advisers Wing, Ministry of Finance, GoP, Islamabad, p.p. 153-187.
- Ejaz Wasti (2017-18) Net Enrollment of Secondary and Higher Secondary level, with status of Schools, the availability of Teachers and Targets for Millennium Development Goals. Economic Survey Report. Economic Advisors Wing, Ministry of Finance, GoP, Islamabad p.p. 158-195.
- Jacob Merew Katamei and Gedion A. Omwono (2015) Intervention Strategies to improve students, Academic Performance in Public Secondary Schools in Arid and Semi Arid lands in Kenya. International Journals of Social Sciences Studies Vol-3, No.4, p.p.107-120.
- Basharat Mehmood, Bilal Mansoor and Iram Shahzadi (2014). An overview of the status of Education as seen through Expenditure and the Academia, in Pak.JLSc, Vol-VIII, No.8-64, p.p. 575-582.
- Muhammad Sabil Farooq and Yuan Tong Kai (2016). The role of READ (Rural Education And Development) Foundation in quality Education of Pakistan. Journal of Education and practice, Vol-7, No.19, p.p. 01-09.
- Muhammad Imran (2010). Comparative aspect of management observed by head of public and private schools. Contemporary issues in Education Research, Vol-3, No.3, p.p. 63-71.
- Noreen Mujahaid and Muhammad Noman (2015). Infrastructure availability in the Public sector schools. A case study of Sindh province. Journal of Education and Practice Vol-6, No.4, p.p. 60-67.
- Allah Bakhsh Malik (2015). Education for All (EFA): Review Report, Ministry of Education, Training and Standards in Higher Education: Academy of Educational Planning and Management (AEPM), Islamabad, p.p. 01-43.
- Tahira Bibi (2015). Article 25<sup>th</sup>-A: Implication of free and Compulsory Secondary Education. Punjab Education Survey (PES) VFAST. Transactions on Education and Social Sciences, Vol-6, No.1, p.p. 01-06.



## AN UPDATED APPROACH TO THE ECONOMICAL ASPECT OF A DAIRY BUFFALO UNIT, IN RURAL, ISLAMABAD

Tabinda Khawaja<sup>1</sup> and Muhammad Hafeez<sup>2</sup>

### ABSTRACT

A small dairy unit in rural Islamabad was evaluated for economical aspects, during the years 2017 is with six (6) dairy buffaloes the record (from daily register) was critically examined for (a) Feed Ingredients {(i) green fodder, (ii) dry roughage}, and (iii) concentrates and (b) operational cost comprising (i) labor cost (ii) utility bills (iii) animal health coverage with (iv) miscellaneous expenditure. The owner of this dairy unit had one animal shed and six buffaloes (including 04 buffaloes calves) along-with water availability electricity, sui gas and a motor-bike plus necessary milk utensils. The daily cost of feed averaged in the year 2018 @ Rs.465/-, 470/-, the labor including miscellaneous cost calculated was Rs.80/- per day, with total operational cost as Rs.550/- while the production of milk on an average was 10.5 liters per day/per buffaloes, totaling 60-65 liters. The Farm Gate Price (FGP) @ Rs.85/- per liter was Rs.850/- per buffaloes with a net saving of Rs.300/- per buffalo, as compared to Rs.280-285/- per buffalo/per day, in the year 2017. The monthly, six monthly and yearly calculators worked out evidence a steady rise of prices. A minimum of Rs.10-15/- per liter was evident to be earned by the middle men and the retailer, in both the years, of this study.

**Keywords:** Small dairy unit buffaloes Islamabad rural Pakistan.

Article Received: September-2018

Accepted: October-2018

Published: December-2018

### INTRODUCTION:

Economical units of dairy farming (both cows and buffaloes) have proved encouraging for the beginner farmers and profitable economic activity, documented not only at home by workers such as Muhammad Hafeez (2011) and Mashook Ali Bhutto and Muhammad Hafeez (2013) setting priorities in milk production by the year 2030 while from other developing countries of the South Asia region such as Delgado (2003), years ago forecasted increase in milk production for Pakistani nationals. Milk produced both by cows (low fat 3.2% – 3.6%) as well buffaloes (high fat 5.8% – 6.8%) is lavishly taken as boiled milk, in the houses, in the milk retailers shops, (sometimes with sweetened “Jalaibeas” a local traditional sweet as “Doodh jalaibeas”, as famous sweet dish, served in bowls, liked by both men and women together with children.

During 2008-09, till 2011, the fresh milk transported was by 147 motorcycles, loaded with cans by gawalas, and milk vans from six roads linked with Rawalpindi (RWP) and Islamabad (ISBD) Twin Cities namely Khat road,

<sup>1</sup>Ex-Assistant Professor, Agriculture Department, AJK, University.

<sup>2</sup> President, Livestock Development Foundation (LDF), Islamabad.

Chakri road, Peshawar Road Lahore, Rawalpindi Road, Murree Road, Park Road and link roads namely Chak beli-Rawalpindi roads, kalar Sayyadan Humak road, Kahuta Rawat road and Haripur Taxila-Rawalpindi road etc (Muhammad Hafeez (2008) Muhammad Hafeez (2011) while these transporters have crossed 200 plus with a greater number of open vans during 2017-2018 (personal communication of the authors).

The national information on human population, as updated in September 2017, was recorded as 207.74 millions and the Livestock population update was recorded as cows 38.7 millions and buffaloes as 32.85 millions in the country while the milk produced by the Milch (in milk) animals, both cows and buffaloes was recorded as 7.84 million tons Wasti Ejaz (2017-18). A major portion of National milk produced is purchased, on daily basis, (both morning and evening milk) by the milk processing dairy plants 06 in Punjab and two (02) in Sindh province. This processed milk is pasteurized, packed in one litre, ½ litre, Quarter liter and 1-1/2 liter packs and are available in the market.

In 2010-11, more-than 14000 small farmers of sheep and goats (established farms) for mutton production and 8000 large animal farmers (Established farms with housing facilities, farm equipment and drinking water facilities which were contributing milk and meat requirements of our country as documented by Afzal (2010-2011), in the Federal Livestock and Dairy Development Board Report, Ministry of Food Securities and Research, GOP, Islamabad.

The prices of feed and fodder showed a steady but sustained increase affecting the fresh milk prices (increasing with reciprocal tune without any hue and cry), in the country which is evident from this study carried out for comparison for the years 2017 and 2018 with the main objective to provide research based evidence to our Readers, Researchers and Academia and Planners Researches at home and abroad have forwarded their results such/as by Muhammad Hafeez (2016) under the caption of “economic Comparison of two Dairy Units” (i) buffaloes’ heifers (grown to first calvers) and (ii) first calvers purchased from the market for milk production indicated buffalo heifers grown at the same farm. The milk produced gave maximum production and more births than first calvers, at that

farm, for six years, since 2011 through 2012, 2013, 2014, 2015 and 2016. In another effort by Muhammad Hafeez (2014) "Trends of Feasibilities for Dairy buffaloes Farming", based on market rates (over previous ten years from 2002 to 2013, in four categories of A (with 14 buffaloes), B (with 28 buffaloes), C (with 56 buffaloes) and D (with 112 buffaloes) kept a various dairy farms, over one decades period. Complete data of (i) cost of buffaloes (ii) feed and fodder (iii) operational cost and (iv) animal health coverage was worked out and documented.

## **MATERIAL AND METHODS:**

1. The data was collected from the daily register(s) of the farmer (of two years 2017 and 2018).
2. The prevailing Farm Gate Prices (FGP) were simultaneously collected from the farm record.
3. Complete information was gathered from (i) the gawalas, (ii) the van-drivers, (iii) milk distributors and (iv) Retail Shops.
4. Continuously, quarter wise, information was also collected from the retailers at feeds, for 04 quarters, each year.
5. The data was subjected to proper statistical analysis (Excel ANOVA vx-16) for comparison and significance to the probability level of  $P < 0.001$  and  $P < 0.001$ , or  $P < 0.05$  level, using "T" test.

## **RESULTS:**

### **(a) Cost of feed and fodder (2017)**

The cost of (i) green fodder was recorded as Rs.280-300/- per 40 kgs (ii) wheat straw @ Rs.8/- per kg (320 per 40 kgs), (iii) wheat bran @ Rs.780/- to Rs.800/- per 40 kgs while (iv) Oil seed cake (mostly ani-oil-seed cake (sarson and/or Torea @ Rs.28/- to Rs.30/- per kg (a bag of 30 kgs sold @ Rs.900/-). The common salt (iodized) was @ Rs.10/- kg ( $1/3^{\text{rd}}$  of a kg was used in the feed and fodder mixed, twice daily). The total cost of feed and fodder was recorded as Rs.542/- per buffalo, as appear in table No.01.

### **(b) Over head cost of six buffaloes (2017)**

The over-head cost included (i) labor salary @ Rs.8000/- per month, (ii) animal health care service (one veterinary Assistant, Part Time, @ Rs.3000/- per

month and (iii) cost of medicine and vaccines including detergents, kitchen etc to Rs.3000/- per month and (iv) utility bills @ Rs.1000/- per month, totaling Rs.15000/- per month for six buffaloes unit, which appeared as Rs.133.33 as per buffalo per day, displayed in table No.02.

### (c) Operational cost of six buffaloes in 2017

Both the cost of feed and fodder as well as overhead cost, collectively appeared as Rs.675.20 per buffalo per day and the daily cost likewise showed Rs.4051.20 per six buffaloes, detailed in table No.2.

**Table No.1 showing cost of feed and fodder in local market of Rawalpindi Islamabad**

| Sr.# | Feed type                     | Rate<br>Rs. 40<br>kgs | Rate/Kg     | Qty per<br>buff. | Cost (Rs.)<br>Per buff. |
|------|-------------------------------|-----------------------|-------------|------------------|-------------------------|
| 01   | Green Fodder                  | 320                   | 8.00/-      | 25               | 200/-                   |
| 02   | Wheat Straw                   | 400                   | 10/-        | 08               | 80/-                    |
| 03   | Wheat bran                    | 700                   | 17.5/-      | 07               | 123/-                   |
| 04   | Conc. Feed<br>(oil seed cake) | 1050                  | 26/-        | 05               | 132/-                   |
| 05   | Common Salt                   | 600                   | 15/-        | 1/2              | 7/-                     |
| (a)  | <b>Sub total:</b>             |                       | <b>76.5</b> | <b>45.5</b>      | <b>542/-</b>            |

Source: Markets personal communication of Authors.

**Table No.2 showing overhead cost of six buffaloes dairy unit, in Rural Islamabad-2017**

| Sr.# | Number of Gawalas                                   | Salary<br>(PM)<br>Rs. | Salary<br>Rs./day | Per buff<br>(Rs.) |
|------|---|-----------------------|-------------------|-------------------|
| 01   | 01  | 8000/-                | 266/-             | 44.33/-           |
| 02   | Animal Health Care (Vety. Assistant)<br>(part time) | 3000/-                | 100/-             | 16.66/-           |
| 03   | Miscellaneous (kitchen etc)<br>detergents, dusters  | 3000/-                | 100/-             | 16.66/-           |
| 04   | Utility bills (Electricity + sui gas)               | 1000/-                | 33.33/-           | 55.55/-           |
| (b)  | <b>Sub total:</b>                                   | <b>15000/-</b>        | <b>500/-</b>      | <b>133.2/-</b>    |

(A+B) Operational cost (feed and fodder and overhead expenditure) Rs..  
Daily per buffalo 675.2  
Daily per six buffalo 4051.2  
Per month per month/6 buff. 1,21,536.00

(c) Production of Milk @ 11 lit./day/buff  
Liters per month 1980 liters  
Sale (FGP) 85/- 5610/-  
6 buff./per month 168,300/-  
Gross saving 1,68,300 – 1,21,536  
Per year Rs.2,80,440/- = 46767/-

Source: Authors calculations based on market rates.

**Table No.3 showing cost of feed and fodder in local market of Rawalpindi Islamabad subject to the availability of sheds and water arrangements**

| Sr.# | Feed type                  | Rate Rs.      | Rate/Kg     | Qty per buff. | Cost (Rs.) Per buff. |
|------|----------------------------|---------------|-------------|---------------|----------------------|
| 01   | Green Fodder               | 360/-         | 9/-         | 25/-          | 225/-                |
| 02   | Wheat Straw                | 400/-         | 10/-        | 08/-          | 80/-                 |
| 03   | Wheat bran                 | 800/-         | 20/-        | 06/-          | 120/-                |
| 04   | Conc. Feed (oil seed cake) | 1200/-        | 30/-        | 05/-          | 150/-                |
| 05   | Common salt                | 600/-         | 15/-        | 1/2           | 5/-                  |
| (a)  | <b>Sub total:</b>          | <b>2880/-</b> | <b>48/-</b> | <b>44.3/-</b> | <b>580/-</b>         |

Source: Authors calculations based on market rates.

**Table No.4 showing over head labor cost and miscellaneous expenditure for six buffaloes (Rawalpindi Islamabad)**

| Sr.# | Cost of Labor                       | Per month | Per day      | One buff.   |
|------|-------------------------------------|-----------|--------------|-------------|
| 01   | Gawalas                             | 9,000/-   | 300/-        | 50/-        |
| 02   | Vety. Assistant (part time)         | 3000/-    | 100/-        | 161/-       |
| 03   | Electricity and SNGPL miscellaneous | 1000/-    | 33.33        | (av.)       |
|      |                                     | 1200/-    |              |             |
| (b)  | <b>Sub total:</b>                   |           | <b>473/-</b> | <b>86/-</b> |

Table expenditure (A+B) 465+80 = 665/-

Source: Authors calculations based on market rates.

**Table No.03(b) showing production of milk and Farm Gate Price:**

| Sr.# | One buff. | Production (liters) six buff. | Per day | Per month | @ Rs. | Cost/Year |
|------|-----------|-------------------------------|---------|-----------|-------|-----------|
| 01   | 12        | 72                            | 72      |           | 85/-  | 1020/-    |
| 02   | 11        | 66                            | 66      | 2160      | 80/-  | 1,58,400  |
| 03   | 11        | 66                            | 66      |           |       |           |

Source: Authors calculations based on market rates.

**Table No.4 showing variation in FGP, the middle man and retail price of fresh milk local markets of RWP-ISBD town cities, 2018.**

| Sr.# | Period          | Farm Gate Price | Middle Man price | Retail Price |
|------|-----------------|-----------------|------------------|--------------|
| 01   | Jan-Mar-2018    | 84-87/-         | 85-86/-          | 86-88/-      |
| 02   | April-June-2018 | 85-88/-         | 88-89/-          | 88-90/-      |
| 03   | July-Sept-2018  | 89-98/-         | 90-92/-          | 92-94/-      |
| 04   | Oct.-Dec.-2018  | 94-95/-         | 96-98/-          | 100-105/-    |

Personal observation and verification of record of the farmer by the authors ICT, ISND

Source: Authors calculations based on market rates.

**Table No.05 showing variation of FGP, the middleman and retail price of fresh milk, in local market of RWP-Islamabad, 2017.**

| Sr.# | Period          | Farm Gate Price | Middle Man price | Retail Price |
|------|-----------------|-----------------|------------------|--------------|
| 01   | Jan-Mar-2018    | 80-82/-         | 82-84/-          | 85-86/-      |
| 02   | April-June-2018 | 84-85/-         | 86-87/-          | 87-88/-      |
| 03   | July-Sept-2018  | 85-88/-         | 89-90/-          | 90-92/-      |
| 04   | Oct.-Dec.-2018  | 89-90/-         | 90-93/-          | 94-95/-      |

Personal observation and verification of record of the farmer, by the author 2017.

Source: Authors calculations based on market rates.

**(d) Production and sale of milk in 2017.**

On an average one buffalo produced 11 liters per day, with simple calculations, six buffaloes provided 66 liters/day. The Farm Gate Price (FGP) recorded, at the farm, was Rs.85/- fetching Rs.5610/- with a gross saving of Rs.1559 per six buffaloes/day. Simultaneously (1) monthly (2) six monthly and (3) yearly calculations were also recorded for six buffaloes as Rs.46764, Rs.02,80,440 and Rs.5,60,880/- respectively as detailed in table no.03

**(e) Cost of feed and fodder for 2018 (upto 20<sup>th</sup> December)**

During 2018, the cost of 25 kgs green fodder, 08 kgs wheat straw, 06 kgs wheat bran and conc: feed (oil seed cake) 05 kgs and common salt 1/3 kgs was recorded, on an average, Rs.225/- 80, 120, 150 and 05 respectively with a total cost (of feed and fodder) per buffalo as Rs.580/- per day hence for six buffaloes daily feed and fodder was recorded as Rs.3480, as laid down in table No.3(a).

**(f) Over head cost of six buffaloes during (2018)**

The overhead cost of salary of one gawala, animal health care service, utility bills and miscellaneous per month were recorded as Rs.9000/-, Rs.3000/-, Rs.1000/- and Rs.1200/- totaling Rs.14200 with per day cost as Rs.473/- and one buffalo as Rs.80, as detailed in table No.3(b).

**(g) Operational cost (both feed and fodder and overhead) 2018**

The overall operational cost (when combined) was recorded as Rs.660/- per buffalo per day and for six buffaloes Rs.3960/- per day, displayed in table No.3(c)

**(h) Production and sale of milk (2018)**

The Farm Gate Price (FGP) of milk was recorded as Rs.90/- (with the range of max. Rs.95 and min. 88), over 12 months. The quarter wise rates of milk are also presented in table No.4. The middle men and retail rates have also been recorded at the farm.

The sale income of milk @ Rs.95/- per liter for one buffalo (with production of 11 liters) in one day appeared as Rs.1045/- with a gross margin of Rs.385/-. The details of middle men and retailers have also been reflected in table No.4.

**BREIF DISCUSSION:**

The cost of feed and fodder as well as operational cost (inclusive over head expenditure) showed an increasing trend which sustainably affected the slow and steady increase in FG Price, the middlemen and retailers price over the last two decades, as already documented by Muhammad Hafeez (2008), (2011) and (2013). The results of this study provided us recent prevailing market rates of feed and fodder which rose to Not less than 06-08% while middlemen enhanced their rates, based on transportation and labor cost hardly to 4-5% but retailers rates showed rising upto 06-07%, over the previous years and in this study as well. The production rates are lesser specially in central Punjab. The dairy milk plants are purchasing fresh milk right from Bhawal (Sargodha), Sheikhpura, Okara, Sahiwal, Pak-Pattan, Arif Wala and the Nili-Bar belt of Irrigated plane areas with less than Rs.70/- from the Livestock farms, even then farmers are getting net margin of Rs.04-06, per liter based on their fat percentage, as documented by Muhammad Hafeez et.al (2016), duly deliberated in the forecasting write-up by Mashook Ali and Muhammad Hafeez (2013), in setting priorities for livestock production (of milk and meat) to the year 2030. Although livestock farmers have been registered in 2010-11 (duly reported by M. Afzal (2010-11), under the Federal Livestock and Dairy Development Board (FLDDB), GOP, Islamabad, the increase in human population of 2017, to the tune of 207.74 million, the milk and meat consumption has been a demand of the Nation and small farmers are playing their national duty. An economical activity with less margins, the production of food items such as milk (fresh milk) for men, women and children (as complete diet) has added in the National Milk Production.

**CONCLUSIONS:**

1. Small farmers are involved for milk production with little capital of six buffaloes Unit, an animal shed, sufficient dairy shed equipments for milk, just one gawalas, sufficient for six buffaloes, per day/per month and/or per year.
2. The cost of feed and fodder increased not less than 06-08% and simultaneously milk FG price also increased to the tune of 05-06%, over the previous year.



3. The rate of feed and fodder, over head cost of total operational cost are greater by 11-12% in this Potohar area as compared to irrigated areas of Punjab where rates of green fodder and labor cost are lessor in Rawalpindi Islamabad Twin Cities and the rates of fresh milk are also less at a very convenient rates by 6-8%.

#### **RECOMMENDATIONS:**

- It is suggestively recommended that green fodder may be grown by the agriculture farmers on 05-06% increased land for feeding dairy animals.
- Small farmers are also requested to go for whole sale feed and fodder for still better margins of milk (sold in the local markets).
- Farmers (milk producers) must avoid middle men.
- Livestock and Dairy Development Department (LDDDs) in the provinces as well as ICT, Islamabad must also extend Animal Health Care Service (AHCS) on 50:50 share, so that 50% of the cost of AHCS is reduced to the milk producing farmers.

#### **REFERENCES:**

- Delgoda (2003). Milk and Meat requirements for Pakistan with the increasing population, in future. FAO Technical Report.
- Muhammad Hafeez (2011). Milk and Meat production and future requirements for Pakistan. Livestock Industry: Test book. HEC Publications, Monogram Series, Islamabad Pakistan.
- Mashook Ali Bhutto and Muhammad Hafeez (2013) Livestock to the year 2030: setting priorities and targets for further needs of milk and mean in the country. Pak.JLSc Vol-V, No.5, p.p. 269-285.
- Afzal. M. (2010-11). Farmers Registered under Federal Livestock and Dairy Development Board (FLDDDB) yearly report, Ministry of Food Securities and Research, GoP, Islamabad.
- Wasti Ejaz (2017-18). Livestock Sector, Agriculture Chapter, Livestock Production, Population and milk and meat data for the year 2017-18, Pak. Economic Survey Report, Economic Advisers Wing, Ministry of Finance, GoP, Islamabad p.p. 135-168.
- Wasti Ejaz (2016-17). Livestock Sector, Agriculture Chapter: Livestock Production population and data on livestock including milk and meat production. Pak. Economic Survey Report, Economic Advisers Wing. Ministry of Finance, GoP, Islamabad.