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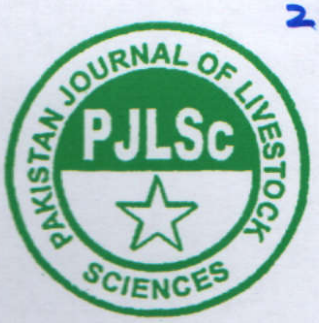

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EDITORIAL

بسم الله الرحمن الرحيم

IN THE NAME OF ALLAH (SWT), THE MERCIFUL, THE BENEFICIENT.

The Editorial Board (EB) of Pakistan Journal of Livestock Sciences (PJLSc) in its 14th meeting held in November, 2014, approved the contents along-with all the approved/recommended and accepted articles, for this Vol-VI (No.06) of 2014.

A total of Nine (09) research and review articles were received and processed, along-with a proposed annual schedule for influx of Articles to be known to regular clientele, numbering 384 at home (Six-60 Livestock Departments, Training and Research Institutions of the country) and some international guests and graduate students.

The publishing of National Indexing and Abstracting Services (NIABS) Vol-I and Vol-II comprising Abstracts No.0001-0027 and No.0028-0042, ISBN Regd. No.978-969-10-8 has been welcomed by many Heads of Academic and Research Institutions including Graduate and Graduating students. At present we remain limited to PJLSc. until any other journal approaches us.

No funding from any corner is received. This is being done on our own resources. The work on next volume-VII, No.07 (2015) is already in progress.

The interest shown in PJLSc. by Scientists of Research Institutions, Academicians of various Agricultural and Livestock Universities, Livestock Training Centres and various Directorate/Directorates General of L&DD Departments, including young graduates is appreciated.

Dr. Muhammad Hafeez
Chief Editor

BOOK REVIEW: A SUMMARIZED POINT OF VIEW ON THE TRAINING MANUAL FOR VETERINARY ASSISTANTS AND A.I. TECHNICIANS

Tabinda Khawaja*and Muhammad Hafeez**

*Assistant Professor, Faculty of A.H. and Veterinary. Medicine, University of Azad Jammu and Kashmir, Rawlakot **Chief Executive, PJLSc. Islamabad.

ABSTRACT

The Training Manual (TM) under review, comprising 14 Lectures, spread over 114 pages is totally a newly written course book in 2012 for the Veterinary Assistants (VAs) and Artificial Insemination Technicians (A.I. Techs:) for one month training program for in-service personnel of Livestock and Dairy Development Departments (LDDDs) of the Country. Course books on animal Reproduction for DVM and MSc(Hons)/M.Phil students are available but little effort has been made in preparing such manuals in Urdu with English vernaculars, where needed. Chapter wise/Lecture wise critical review has been carried out with our frank but technical deliberations, as a recent and simple approach for para-veterinary staff. This will benefit thousands of trainees in the days to come, with recommendations, to be used in Para-Veterinary Training Institutions.

Key words: Training Manual A.I. Para-Veterinary Pakistan.

INTRODUCTION:

A training program was organized by the Director General (L&DDD) AJK, Muzafarabad and the para-Vets. Trainings Institute, Karore, Lal-e-Isan, Layyah, where recent training manual of this kind was needed. Simultaneously Training Institutions such as Agriculture Training Institute (ATI) Peshawar and Animal Husbandry In-service Training Institute (AHTI) with similar institutions in Punjab, Sindh and Balochistan have also shown interest for this Training Manual, ISBN Registered No.978-969-9219-07-08 by Muhammad Hafeez, was required to be reviewed for publishing in the PJLSc.Vol-VI (No.6).

As member Editorial Board, the responsibility was shouldered to review this TM in a critical but envisioned approach with recommendations.

MATERIAL AND METHODS:

The following documents, referred in the Training Manual were consulted as placed in the text:

- The sheep and goats production of Pakistan (2008).
- Livestock Industry-II (2011) Livestock & Poultry Production of Pakistan, HEC Publication.
- Pak. Economic Survey Reports 2009-10, 2010-11 and 2011-12.
- Various Reports/Final Reports of Projects and almost 80-90% of referred documents.

CRITICAL REVIEW:

The booklet/TM, although in simple but technical Urdu, revolves in Chapter wise/Lecture-wise material comprising importance of Animal Breeding and Livestock production, the reproductive system, heat symptoms and duration, touches of animal genetics, milch cows and buffalo production including sheep and goat breeds and production, various institutions dealing with A.I., the non-infections/clinical and the contagious diseases of animals (milch cattle and buffaloes), vaccines for protection of endemic diseases, practical work related to A.I, the duties of an inseminator and lastly the complications of reproductive system have been counted to the knowledge of reader(s).

CHAPTER/LECTURE WISE REVIEW:

The Author has attempted one complete chapter No.1 spread over 11 pages (01-11) and named it the importance of animal breeding program, stating the selection of breeding animals (cows with their bulls as well as buffaloes with their bulls) narrating the characteristics and good milk and meat producing traits amongst an average of 50-60 animals, at a locality/village/farm with a stress on no-disease history of the herd. In the same first lecture the natural way of breeding milch animals within their home tract (with names of various breeds of cattle and buffaloes). The different methods of breeding/mating namely (i) random (ii) inbreeding (iii) cross breeding and (iv) grading/selection have since been detailed. Still in the same lecture material, artificial insemination based breeding has also been narrated with history, benefits, the semen production and training of the bull. The recent approach of selection and production of breeding bulls on DNA Test basis, a recent work of the Author in producing 94 Kundi buffalo bulls in Tando Allahyar, Sindh, during 2010-12 in LDF-PARC-ALP Assisted Project No.AS-137 "Production of Genetically Superior Bulls of Kundi Breed of Buffaloes in Sindh". which has been appreciated and the bulls are getting good price.

The second lecture, chapter No.2, spread over 08 pages (12-19), pertain to reproductive system of both males (comprising testes, penis and the common Uro-gential system) while in females (comprising ovary, gravid ovary, corpus leuteum, eggs, the fallopian tube and the uterus including placenta and various hormones taking part in the reproduction system). These are estrogen, progesterone, Follicle

Stimulating Hormone (FSH), Leutinizing Hormone (LH) and Oxytocin. The male stimulating hormones (Testosterone while others like adrenal and thymus gland hormones) have also been discussed with their functions.

The third lecture, chapter No.3, spread over only four pages (20-23), describes the Estrous cycle of females (cows, buffaloes, sheep and goats) with symptoms of both female and males along-with time of mating. The pregnancy and its three stages including three steps of the parturition have been discussed. This chapter/lecture in a concise manner and summarized points in each heading have been given.

Lecture four, chapter No.4, deals with the shortest possible approach in animal genetics, spread over five pages (24-28) touches the very basic understanding of its contents of concisely the overview and importance in aspect No.1, narrating from (a) to (q) and aspect No.2, the gene and its role in the continuation of breed characteristics, both phenotypic and genotypic with terms and related examples, which is self explanatory and worth studying have been included.

Lecture five, chapter No.5, spread over nine pages (29-37) comprises milch cattle and buffaloes supported with coloured photographs of each breed, at the end. The breed characteristics of both the milch buffalo breeds namely Nili-Ravi of Punjab and Kundi of Sindh Province have been described while a newly emerging breed of buffalo Azakheli or Azi Kheli (low statured and low milk producer) has also been introduced. A full sketch description of milch cows namely Sahiwal and Cholistani of Punjab while Red Sindhi have been included with breed characteristic and milk production. A separate account of Exotic Cows and Cross bred cows has also been given. Low milk producer breeds namely Bhagnari, Dajal, Dhanni, Lohani, Rojhan, Kankerij and Tharparkar are also described with their breed characters and milk production. The coloured plates will definitely differentiate one breed from the other.

Lecture six, chapter No.6, spread over sixteen pages (38-53), along-with six colour plates, pertain to sheep and goats. The lecture starts, as usual, with the importance, their characteristics, population and production for the year 2010-11, with some light on the meat production (mutton produced). The write up summarizes this lecture with main characters of both fat-tail and thin tail sheep

namely live weight at birth, at four months and adult with wool and milk production for each breed has been given. These are Lohi, Thalli, Kajli, Damani, Buchi/Bahawalpuri, Kooka, Kachhi, Khadali, Sipli (under the thin-tailed category). The sheep breeds with fat-tail recorded in this TM include Latti/Salt range, Balochi, Bibrik, Harnai, Waziri, Hasht Nagri, Michni, Tirrahi/Afridi, Balkhi, Kaghani, Dumbi, Baltistani, Gojal, Kohai/Ghizer, Pahari, Poonchi, Kail, Kali, Cholistani, Rakhshani and one exotic breed Rambouillet.

Lecture seven, chapter No.7, spread over 13 pages (54-65) with 06 plates of photos describes the goat breeds of Pakistan. Starting with their importance population, mutton produced and other by-products namely skins, casings and bones etc. Fresh data of 2010-11 and goat production on commercial lines as funded by bank loans, important goat breeds specially the characteristics of each breed such as body wt. at birth, wt. at six months and adult with height, length and girth, in centimeters, have been detailed for Kaghani, Khurrasani, Barbari, Gaddi, Kamori, Pateri, Bujri, Nachi, Jattan/Dhattan, Tapri and Sindh Desi with colour photographs.

Lecture eight, chapter No. 8, spread over three pages only (66-68), is a concise note of various Departments/Institutions dealing with A.I. There are six livestock experiment stations, four teaching institution and one Directorate related to Animal Reproduction in Punjab Province, Livestock Research System (LRS) at NARC, Islamabad. One Deputy Director and two Livestock Farms including one Teaching Institution in Khyber Pakhtun Khwah Province, two teaching institutions, two Directorates and 07 A.I. centres in Sindh while one each in Balochistan and AJK.

Lecture nine chapter No.9, spread over ten pages (69-78), describes the non-infectious/clinical diseases of milch animals. This lecture encompasses first of all the signs of a healthy animal, followed by normal body temperature, pulse rate of various categories and ages of animals, respiration speed etc. For each of the clinical diseases of various systems, the apparent symptoms, diagnosis and medicinal treatment have been described. These are indigestion, impaction of rumen, tympany and milk fever while bronchitis and pneumonia have been selected from respiratory system. This is followed by general hygiene detailed in the annotated form and precautionary measure at the farm.

Lecture ten, chapter No.10, spread over 11 pages (79-89), provides technical approach to understand the infectious diseases of milch animals endemic in our area classified into (i) Viral (ii) Bacterial and (iii) Parasitic in Nature. The symptoms, diagnosis and treatment of each disease has been given such as Haemorrhagic Septicaemia (HS), Black Quarter (BQ), Tetanus, Anthrax, Bacillary White Diarrahea (BWD) and Mastitis in Bacterial Category of Diseases. Under viral category of infections, Foot and Mouth Disease (FMD), Rinderpest, Three Days Sickness (TDS) and Pox are included. The parasitic category of infestations splitted into external and internal parasitic disease, include tick fever, coccidiosis, Liver Flukes, Lung Worms and others. The local Urdu names have also been described, for ready reference.

Lecture eleven, chapter No.11 is a tabulated presentation of two pages (90-91) enumerating bacterial and viral vaccines for prophylactive vaccination. The nature of vaccines, dosage and methology of use has been described. These are Haemonhagic Septicemia Vaccine (HSV), two types, Black Quarter Vaccine (BQV), Anthrax Spore Vaccine (ASV), Rinder Pest Vaccine (RPV), Goat Tissue Vaccine (GTV) three types, Foot and Mouth Disease Vaccine (FMDV) Two types and Anti Rabic Vaccine (ARV) while two sera for FMD have also been detailed.

Lecture twelve, chapter No.12, pertain to practical work in Artificial Insemination (A.I), spread over 10 pages (92-101) describes mainly the Semen Collection methodology, the Artificial Vagina (AV) Preparation/Training of bulls, semen preservation with extenders, the preparation of straws before injection and ultra-deep freezing at MINUS-170°C, in Liquid Nitrogen. The detailed stepwise practical work mainly involves the laboratory work (microscopic examination of semen for sperm morphology, motility or dead sperms, staining of slides, labeling and record of insemination including transportation of semen from the main liquid Nitrogen storages through cold chain liquid nitrogen cans. The inseminators under training have also been provided with the detailed items of an A.I. Kit. Lastly the accurate way of insemination is given.

The second last Lecture thirteen, chapter No.13, describes the important duties of a trained Inseminator. Spread over four pages (102-105). This write-up denotes the obligations and responsibilities to the effect that he/she must be educated,

trained providing practical experience and be dutiful. He/she must be coordinating with officers, colleagues, farmers and must keep updated record so that the Researchers, Planners, Higher Officer should be able to check, note and appreciate this record.

The last Lecture fourteen, chapter No.14, pertains to very technical aspect of reproductive disorders, spread over six pages (106-111), broadly touches the pregnancy toxemia, Latent Heat, An-Estrus, Abortion, Distokia/Dystocia, Retention of Placenta and the Prolapse of uterus as well as prolapse of rectum. The symptoms, physical observations, reasons and causes of various disorders have also been explained. The technical approach of handling these situations and treatments has also been briefly narrated.

NB: The TM is supported with 38 references mostly the recent ones within last 10 years.

FRANK OPINION:

1. The work is brief, summarized, concise and limited to 111 pages, in Urdu, as suited to the Veterinary Assistants (VAs) and A.I. Technicians.
2. Recent Data of 2009-10, 2010-11 and information collected from various project reports, text books international books/monogram series have be referred to and extracts taken.
3. The author has tried to fulfill the required material, as was desired by the trainers and will be used in A.I. training programs in the country.

RECOMMENDATIONS:

1. This Training Manual be included in the course syllabus of Veterinary Assistants (VAs), 03 years program.
2. This training manual must be included in all A.I. Training programs of 09 months and one year diploma course in A.I. throughout the country.
3. Going through this write up we are requesting the Author for making efforts in updating the old course books of Vas, 03 years course, one by one with recent information, if the trainers agree.
4. We may be allowed to put the reference is URDU as are available in the end of this TM. It is hoped that the Editorial Board will appreciate.

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TRENDS OF FEASIBILITIES FOR DAIRY BUFFALO FARMING, BASED ON MARKET RATES OVER PREVIOUS YEARS: ONE DECADE'S PICTURE (2002-2013)

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ABSTRACT

This research paper describes the summarized comparative picture of dairy buffaloes in four categories A(14), B(28), C(56) and D(112), kept at various Livestock/Dairy Farms for one decade (2002, 2004, 2006, 2007, 2008, 2009, 2010, 2011, 2012 and 2013). The feasibilities prepared by the author, based on Agricultural land and other facilities at the farm, were prepared for different farmers (for getting loans from banks) using the prevailing market rates of dairy buffaloes, green fodder (40kgs), wheat straw/bhoosa, the labor/gawala's salaries per month, the cost of veterinary medicines and vaccines with services including miscellaneous expenses (utility bills, disposables, utensils liverier/uniforms, ropes/chains etc.) and R&D expenses only in C & D categories. The sale of milk was taken as main income to work out the saving etc. The extracts taken from the feasibility documents (available with the author) have been reproduced in this paper showing the trends of increases in prices (percentages) from 2002 after two years each upto 2006 and thereafter, each year from 2007 onwards through 2013 (supported with 11 table's data). The paper ends with conclusions and recommendations.

Key words: Buffaloes Dairy Farming Feasibilities Livestock Industry Pakistan.

INTRODUCTION:

Feasibility studies, based on prevailing conditions of any area, the agricultural land of the farmer/owner and existing facilities are prepared as a document for investment strengthening the running farm as well as getting loan/credit from any bank/financial institution. The feasibilities prepared for sixteen farmers/owners by the author since 1992-93 to 2013 available with three kinds of people (the author, the farmer/owner and the bank/financial institution who are the real personnel involved as stakeholders in developing that farm. Some of these documents were discussed in various meetings of the Editorial Board of Pak.JLSc. 2013 and some of these documents have been included in the text books, as an example such as (i) Livestock Industry Code-782, AIOU Book Series (Hafeez M. 2007) and (ii) the Livestock Industry: Livestock and Poultry Production of Pakistan (2011) by Muhammad Hafeez HEC Publication being used for graduate students, at various universities of the country.

The author remained involved in the farming activities on commercial lines since the college life (1966-72) at University of Veterinary and Animal Sciences (UVAS), the then College of Veterinary Sciences (CVS) Lahore. Immediate after the college life when the author remained involved in visiting various dairy farms (1972-1992)

at Veterinary Research Institute Peshawar (VRI)/NWFP (Khyber Pakhtoon Khwa) visiting main Livestock Experimental Stations (LES) in Punjab, various farms in Sindh, specially the Landhi Cattle Colony (LCC) Karachi, Military Dairy Farms, in major districts and AJK. This activity went side by side (on Sundays and Holidays) when performing the duties in the Ministry of Food Securities and Research (The then M/o Food Agriculture and Livestock, MINFAL) Islamabad (1992-2002).

The major hurdle faced by the farmers was obtaining the loans/credit from commercial banks/financial institution, for strengthening their farming activities, by increasing their number of buffaloes form 14 (A) to 28(B) and from B to C (56) while some wanted to mange 112 buffaloes (D) category. The Banks/Financial Institution needed the precious document known as the Feasibility for their appraisal, before granting any loan (M. Hafeez 2002 through 2013).

The feasibility prepared by the author on commercial aspect comprised (i) an introduction (of the farmer/owner), the personnel, the history, the situation of Livestock Farming in the area and interest of the farmers (ii) the existing facilities (dairy animals, the animal sheds, water supply, fodder arrangement, infrastructure etc) (iii) The area profile (irrigated or Barani Agricultural Land, dairy farmers in the area, the market prevailing rates, feed, and fodder availability etc) (iv) The Livestock Sector of Pakistan (the year's populating of Animals, Milk and Meat Production, Import and export data of the year and all relevant information from Pak. Economic Survey Report 2002-03 to 2012-13 and Ministries concerned (v) all ABCDs of the feasibility (thumb rules what is done when and who will do what). The feasibility prepared always included (vi) a plan of work (what type of farming activities will take place in first, second, third and fourth year, schedule of activities, the Livestock Production Management and Animal Health Care etc. Each feasibility was then followed by (vii) Financial Picture, all calculations of expenditure (purchase of dairy animals, salaries of personnel, the feed and fodder including cost of medicines, vaccines, miscellaneous (utility bills disposables farm utensils etc.) and income (through sale of milk male, calves and sale of Farm Yard Manure (FYM), of at least 4-5 years. These were supported with (viii) Financial Analysis and all (ix) documents annexed, as required by the Financial Institutions/banks.

The feasibility prepared for farmers on sound footings and who have really utilized the documents (from A to Z) are now called "Progressive Farmers" and some of these farmers have become "breeder Farmers". The author still takes the beginners/investors as well as graduate students to visit those farms and collect recent data for Research and Development (R&D) work (Hafeez M. 2008) and (2011). The extracts taken from the feasibilities prepared, based on the then prevailing market rates, were welcomed by banks and financial institutions for appraisals and funding, in three equal installments. Majority of the farmers have since paid back their loans within three-four years of their projects, as proposed in those feasibilities as documented by Muhammad Hafeez (2005), (2006) (2008) (2009), (2010) and 2011 as proposed in our new documents (2012) and (2013). The framers who took loan of Rs.0.7 millions in 2010 have returned in 2013 as informed telephonically.

It is hoped that the trends of feasibilities will answer many questions arising in the minds of administrator's, planners, graduate students and farmers. One set of each feasibility is available with the author, as a record which has always been shown to graduating students and all the farmers do have the feasibility prepared for ready reference. Some of these have been documented in the text books by M. Hafeez, Livestock Industry, Code-782, AIOU Book Series and Livestock Industry: Livestock and Poultry Production, published by HEC (2011) for reference.

MATERIAL AND METHODS:

(i) All the feasibilities prepared by the author were re-visited and extracts taken from 2002 through 2013.

(ii) The Financial Analysis based on calculations, of each feasibility, were taken as reference material for this paper.

(iii) All the material (main-power, utility bills and miscellaneous), prepared at each farm (when the feasibility was prepared) were depicted for cumulative operational cost, along-with income generated and summarized for this paper.

(iv) The pay back of loans (in six monthly installments) worked out, was with the mutual consultations of the farmers/owners and the Bank/Financial

Institution personnel, for any specific year was also recorded.

(v) Livestock Sector information was taken from the Pak. Economic Survey Reports, the Livestock Wing, MINFAL. The Agriculture Statistics and the then prevailing market rates of each item of the area for various years, including various reports of NARC and PARC of various years.

RESULTS:

The feasibility trends worked out, as summarized, have given us the following information:-

i. The cost of dairy buffaloes were Rs.20,000/- to Rs.22,000/-, Rs.25000/- to Rs.32000/-, Rs.42000/- to Rs.45000/-, Rs.45000/- to Rs.50000/-, Rs.50,000/- to Rs.60,000/-, Rs.65000/- to Rs.70,000/-, Rs.75000/- to Rs.85000/-, Rs.85000/- to Rs.90,000/-, Rs.95000/- to Rs.1,10,000/- and Rs.90,000/- Rs.01,15,000/- In the years 2002, 2004, 2006, 2007, 2008, 2009, 2010, 2011, 2012 and 2013 respectively as presented in table No.02.

ii. The cost of green fodder in big cities (fodder sale points) of 40 kgs during these year was Rs.40/-, Rs.55/-, Rs.65/-, Rs.70/-, Rs.90/-, Rs.95/-, Rs.100/-, Rs.120/-, Rs.140/- and Rs.160/- while the rate of wheat bhoosa were Rs.80, 86, 88, 90, 95, 100,120,140 and 180 for the year 2002, 2004, 2006, 2007, 2008, 2009, 2010, 2011, 2012 and 2013, respectively as produced in table No.02 this cost was 20-25% lower in Agricultural rural areas.

iii. The cost of milk per liter (market rate) was rupees 20,22,24,26,32, 40,50,60,75 and 80 for the years 2002, 2004, 2006, 2007, 2008, 2009, 2010, 2011, 2012 and 2013 respectively, as detailed in table No.02.

iv. The operational cost comprised (i) Labor salaries per month (ii) the cost of green fodder and wheat bhoosa (iii) cost of veterinary medicines and vaccines with AH care services and the (iv) miscellaneous expenditure. The miscellaneous expenditure included utility bills, liveries/uniforms disposables, messing/kitchen, ropes/chains, spades, brooms, hand trolleys etc. etc. The labor rates in the years 2002, 2004, 2006, 2007, 2008, 2009, 2010, 2011, 2012 and 2013 were Rs.3,000/- Rs.3,500/- Rs.35,000/-, Rs.4,000/-, Rs.4,500/-, Rs.5,000/-, Rs.5,500/-, Rs.6,000/-, Rs.7,000/-, Rs.7,500/- and Rs.8,000/- per month, with messing arrangements by the farmers/owner, in

most of the times, as detailed in various tables.

v. The data in each feasibility was categorized as A (14 buffaloes), B (28 buffaloes), C (56 buffaloes) and D (112 buffaloes) and have separately been taken, from the reported years. These economic units were formulated for those beginners and small farmers who were already raising a smaller dairy units of 6-7 buffaloes and needed financial assistance for strengthening their dairy units(s).

vi. The financial analysis was made for each farmer, based on the expenditure incurred and income fore-seen as (i) in the form of sale income of milk, (ii) the sale of male calves after 2-3 years and (iii) sale of FYM after every six months or one year. This analysis is reproduced from feasibilities which indicate that the total loan obtained was paid back in between 3rd year to 4th year of the operation of the project at any single farm, and no defaulter identified, in this period.

vii. None of the farmers were in loss except one farmer who sold the farm and shifted to another business.

Table No.1 showing feasibilities prepared for farmers with area of agricultural land (ownership) and number of dairy animals projected (last one decade).

Sr.#	year	Name of Farm/Company	Piece of land	Dairy Animals	New sheds	Total Rs. (Millions)
01	1996-97	M/S Atabak Pharma (Pvt) Ltd. ISB	08 Kanals (Pharmaceuticals)	02	Kanals Covered Area	17.00
02	1999	M/S Galosh International, Dubai UAE	300 Kanals	120 buffaloes	03	36.00
03	2000	M/S Khwaja Glass Co. Rawalpindi (Farm Tanaza Dam)	410 Kanals	50 buffaloes	01	14.00
04	2002	M/S Pak. Livestock Farm Complex RWP (at Sapiala Dam Kanyal F/Jang)	436 Kanals	1000 buffaloes 60,000 sheep/ Goats.	30	115.00
05	2002	Farsalan Dairy Farms Pind Begawal	13 Kanals	14 Dairy buffaloes	02	0.52
06	2003	M/S Jamal Dairy Farms, Chak Beli Khan	530 Kanals	120	04	58.00

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Sr.#	year	Name of Farm/Company	Piece of land	Dairy Animals	New sheds	Total Rs. (Millions)
07	2002-03	M/S Electro Vet. Pharma ISBD	200 Kanals	15 Fatn./ Calv.	03	17.00
08	2004	M/S Hathial Farms Sargodha, Bhalwal	180 Kanals	50 Dairy buffaloes	02	1.81
09	2004	M/S kamal Mustafa Farms Golra-sharif ICT, Islamabad	08 Kanals	200 Goats 06 buffaloes.	01	0.74
10	2006	M/S Haji Fateh Din Farms, F/Jang	180 Kanals	56 buffaloes	03	15.00
11	2008	M/S Pindochi Dairy and Agri. Farms, PDK Chakwar	65 Kanals	14 buffaloes. 50 goats	02	0.86
12	2010	M/S Mir Dairy Farm for Mumtaz Ali Bhutto Garhi Khuda Bukhs Larkana	1500/- Kanals	56 buff. with fattening calves	02	12.5
13	2011	M/S Tech: Access Balkisar	900 Kanals	100 Dairy Buff.	03	11.25
14	2011	Deptt. Of Agri. Sc. AIOU, ISBD H-8	180 Kanals	56 buff. 50 sheep 6,000 Poultry Birds	03	11.70
15	2012	Small Economic Unit. LDF, Training Manual for Rural Deve. Course Book	Fro Qty. farmers/ students	06 buffaloes economic unit	01	9.4
16	2013	Feasibility in Micro-Economic LDF Text-book	Qty. for students and farmers	14 Buff. Economic unit	02	12.8

Source: Feasibility documents prepared by the author.

Table No.2 showing the retail prices of dairy buffaloes, labor, green fodder, wheat bhoosa cost of shed and retail prices of milk, over previous years (Pak. rupees)

Sr.#	year	Cost of one dairy buff.	Labor rate P.M.	Green Fodder 40 kgs	Wheat Bhoosa 30Kgs	Cost of one shed (18x40)	Cost of milk/liter
01	2002	25,000/-	3000/-	50/-	25/-	50,000/-	20/-
02	2004	45,000/-	3500/-	60/-	30/-	70,000/-	22/-
03	2006	50,000/-	4000/-	70/-	35/-	90,000/-	28/-

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Sr.#	year	Cost of one dairy buff.	Labor rate P.M.	Green Fodder 40 kgs	Wheat Bhoosa 30Kgs	Cost of one shed (18x40)	Cost of milk/liter
04	2007	55,000/-	4500/-	80/	40/-	1,20,000/-	32/-
05	2008	60,000/-	5000/-	110/-	45/-	1,30,000/-	40/-
06	2009	70,000/-	5500/-	120/-	50/-	1,40,000/-	50/-
07	2010	75,000/-	6000/-	140/-	60/-	1,60,000/-	55/-
08	2011	80,000/-	7000/-	160/-	65/-	1,90,000/-	60/-
09	2012	85,000/-	8000/-	180/-	70/-	2,10,000/-	70/-
10	2013	90,000/-	9000/-	190/-	80/-	2,40,000/-	80/-

Source: Livestock Development Foundation ® Islamabad:
Courtesy: Livestock Industry, Code 782-AIOU Book Series.
Livestock Industry-HEC Publication Series 2011.

Table No.03 showing operational cost and sale of milk in four categories of dairy farms in the year 2002

Sr.#	Particulars	A 14	B 28	C 56	D 112
	Cost of Dairy Buffaloes	0.42	0.84	1.68	3.36
	Operational Cost				
01	(i) Labor @ Rs.3500/-	0.072	0.144	0.288	0.576
02	Green Fodder Rs.60/- per 40 kgs	0.255	0.511	1.022	2.044
03	Wheat Bhoosa (10 kgs) Rs.80/- per40 kgs	0.127	0.255	0.51	1.02
04	Medicines/Vaccines Utility Bills	0.010	0.015	0.02	0.025
05	Miscellaneous	0.02	0.03	0.04	0.045
06	R&D	-	-	0.025	0.05
07	Total Operational	0.48	0.955	1.905	3.76
08	Sale income of milk Rs. 30/- per liter	0.854	1.708	3.416	6.832

Source: Feasibility documents prepared by the author.

Table No.04 showing operational cost and income sale of milk in four categories of dairy farms in 2004.

Sr.#	Particulars	A-14	B-28	C-56	D-112
	Cost of Dairy Buffaloes 40,000/-	0.560	1.120	2.240	4.480
	Operational Cost				
01	(i) Labor @ Rs.3500/-	0.084	0.168	0.336	0.672
02	Green Fodder Rs.60/ per 40 kgs	0.306	0.612	1.224	2.448

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Sr.#	Particulars	A-14	B-28	C-56	D-112
03	Wheat Bhoosa Rs.80/- per 40 kgs	0.102	0.204	0.408	0.816
04	Medicines/Vaccines, Utility Bills	0.015	0.020	0.225	0.030
05	Miscellaneous	0.025	0.030	0.040	0.060
06	R&D	-	-	0.030	0.050
07	Total Operational Cost	0.532	1.034	2.063	4.07
08	Sale income of milk @ Rs.30/-	1.281	2.562	5.124	10.248

Source: Feasibility documents prepared by the author.

Table No.05 showing the summarized operational cost of dairy buffaloes during 2005 at a farm (in millions Rs.)

Sr.#	Particulars	Dairy Animal at a farm			
		A-14	B-28	C-56	D-112
01	Cost of Animals @ Rs.50,000/-	0.70	1.40	2.80	5.60
	Operational Cost				
02	Labor @ Rs.4500/- each PM	96,000/-	1,92,000/-	3,84,000/-	7,68,000/-
03	Green Fodder @Rs.55/-per 40kgs	36,500/-	73,000/-	1,46,000/-	4,92,000/-
04	Wheat Bhoosa 10 kgs per animal/day	7300/-	14,600/-	2,92,000/-	58,4000/-
05	Medicines/Vaccines	3000/-	6000/-	8000/-	12,000/-
06	Miscellaneous	5000/-	10,000/-	15,000/-	20,000/-
07	R&D	-	-	0.05	0.10
08	Total Operational cost	1,48,800/-	2,92,600/-	8,45,000/-	19,76,000/-
	Sale income of milk yearly production	51,100/-	102,200/-	2,04,400/-	4,08,800/-
	@ 10 liters/day	12,77,500/	25,55,000/-	51,10,000/-	1,02,20,000/-
	@ Rs.25/- liter	1.277	2.555	5.11	10.22

Source: Feasibility document prepared by the author.

Table No.6 showing the summarized cost (operational cost) of Animals during 2006 at a farm (in millions Rs.)

Sr.#	Particulars	A-14	B-28	C-56	D-112
	Cost of animals	0.70	1.40	2.80	5.60
	Operational Cost				
	Labor @ Rs.4500/- each PM	0.108	0.216	0.432	0.864
01	Green Fodder @ Rs.70/- per 40 kgs	0.255	0.511	1.022	2.044
02	Wheat Bhoosa @ 10 kgs	0.120	0.260	0.520	1.040
03	Medicines/Vaccines	0.01	0.015	0.020	0.030

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04	Miscellaneous	0.02	0.025	0.030	0.040
05	R&D	-	-	0.05	0.10
06	Total Operational Cost	0.52	1.03	2.070	4.12
07	Sale income of milk (In millions Rs.)	1.64	3.28	6.56	13.12

Source: Feasibility document prepared by the author.

Table No.7 showing the summarized operational cost of dairy buffaloes during 2007 at a farm

Sr.#	Particulars	A-14	B-28	C-56	D-112
	Cost of Dairy Buffaloes @ Rs.50,000/- each	7,00,000	14,00,000	28,00,000	56,00,000
1	Rs.55,000/-	0.777	1.554	3.108	6.216
	Operational Cost				
2	Green Fodder @ Rs.80/- per 40 kgs	4500/-	1,08,000/-	2,16,000/-	4,32,000/-
3	Wheat Bhoosa @ Rs.60/- kgs/buff /day 40/-	3,06,600/-	6,13,200/-	12,26,400/-	24,52,800/-
4	@10kgs per buff. per day	1,27,750/-	2,55,500/-	5,11,000/-	10,22,000/-
5	Miscellaneous	4000/-	10,000/-	26,00/-	45,000/-
6	Medicines/Vaccines AH/Care, Service	8000/-	20,000/-	25,000/-	30,000/-
7	R&D	-	-	0.05	0.10
8	Total Operational Cost	0.550	1.114	2.270	6.60
	@ 10 liters/buff/day	15,33,000/-	30,66,000/-	61,32,000/-	1,22,64,000/-
	@ Rs.32/- per liter	1.53	3.064	6.132	

Source: Feasibility document prepared by the author.

Table No.08 showing the summarized operational cost of dairy buffaloes during 2008 at a farm

Sr.#	Particulars	A-14	B-28	C-56	D-112
	Cost of Dairy Buffaloes @ Rs.60,000/- each	0.84	1.68	3.36	0.96
	Operational Cost				
01	Labor @ Rs.5,000./- each per month	0.12	0.24	0.48	0.96
02	Green Fodder @ Rs.110/- per day	0.46	0.92	1.84	3.38
03	Wheat Bhoosa @ Rs.45/- per kgs/buff/day	0.23	0.46	0.92	1.68

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Sr.#	Particulars	A-14	B-28	C-56	D-112
04	Medicines/Vaccines & AH Care/Service	0.01	0.02	0.03	0.04
05	Miscellaneous	0.02	0.03	0.08	0.08
06	R&D	-	-	0.05	0.10
07	Total Operational	0.84	1.67	3.38	6.7
08	Sale income of milk (a) Production (b) @ Rs.45/-	2.044	4.088	8.176	16.35

Source: Feasibility document prepared by the author.

Table No.9 showing the summarized operational cost of buffaloes in 2009, at a farm.

Sr.#	Particulars	A-14	B-28	C-56	D-112
	Cost of Buffaloes @ Rs.70,000/-	0.98	1.96	3.92	7.84
	Operational cost				
01	Labor @ Rs.5500/- each PM	0.120	0.240	0.480	0.960
02	Green Fodder @Rs.120/- per animal/day	0.488	0.818	1.640	3.270
03	Wheat Bhoosa @ Rs.50/- per day/buff.	0.153	0.366	0.613	1.230
04	Medicines/Vaccines + AH Care/Service	0.01	0.020	0.040	0.080
05	Miscellaneous	0.012	0.020	0.040	0.088
06	R&D	-	-	0.050	0.10
07	Total Operational	0.783	1.464	2.863	5.728
08	Sale income of milk of Milk (c) Production million lit. (d) @ Rs.50/- per lit.	 0.051 2.295	 0.102 4.590	 0.204 9.180	 0.408 18.360

Source: Feasibility document prepared by the author.

Table No.10 showing the summarized operational cost of dairy buffaloes in the year 2010 at a farm

Sr.#	Particulars	A-14	B-28	C-56	D-112
	Costal of Dairy Buffaloes @ Rs.75000/-	1.05	2.10	4.20	8.40
1	Labor @ Rs.6000/- each, PM	0.144	0.288	0.576	1.152
2	Green Fodder @ Rs.140/- per animal/day	0.48	0.96	1.92	3.84

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Sr.#	Particulars	A-14	B-28	C-56	D-112
3	Wheat Bhoosa @ Rs.60/- per animal/day	0.24	0.88	1.76	3.52
4	Medicines/Vaccines	0.02	0.03	0.035	0.040
5	Miscellaneous	0.02	0.04	0.06	0.078
6	R&D	0.00	0.00	0.05	0.10
7	Total Operational	0.904	2.25	4.91	8.92
8	Sale income of milk @Rs.55/- per liter.	2.35	4.7	9.4	18.8

Source: Feasibility document prepared by the author.

Table No.11 showing the summarized operational cost of buffaloes in 2011 at a farm (in million Rs.)

Sr.#	Particulars	A-14	B-28	C-56	D-112
	Cost of Dairy Buffaloes @ Rs.80,000/-	1.12	2.24	4.48	8.96
	Operational Cost				
1	Labor @ Rs.7000/- each PM	1.68	3.36	6.72	13.44
2	Green @ Rs.160/- per	0.817	1.634	3.268	6.536
3	Wheat Bhoosa @ Rs.65/- per buff/day	0.332	0.664	1.328	2.656
4	Medicines/Vaccines	0.02	0.05	0.10	0.12
	Miscellaneous	0.02	0.04	0.08	0.12
5	R&D	-	-	0.05	0.10
6	Total Operational Cost	2.869	5.748	11.546	22.972
	Total Production million litr.	0.427	0.854	1.708	3.416
8	Sale Income of milk @ Rs.60/- per liter	2.56	5.12	10.24	20.48

Source: Feasibility document prepared by the author.

Table No.12 showing summarized operational cost of buffaloes in 2012, at a farm (in millions Rs.)

Sr.#	Particulars	A-14	B-28	C-56	D-112
	Cost of Dairy Buffaloes @ Rs.85,000/- and/or @ Rs.1,00,000/-	1.190 1.40	2.380 2.80	4.760 5.60	9.520 1.120
	Operational Cost				
1	Labor @ 8000/- PM	0.192	0.384	0.768	1.536
2	Green Fodder @ Rs.180/- per/buff/day	0.91	1.82	3.64	7.28

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Sr.#	Particulars	A-14	B-28	C-56	D-112
3	Wheat Bhoosa @Rs.70/- each	0.35	0.75	1.50	3.00
4	Medicine/Vaccines A.H. Care Services etc.	0.025	0.05	0.08	0.10
5	Miscellaneous/Expenditure	0.030	0.060	0.120	0.240
6	R&D	-	-	0.02	0.10
	Total Operational Cost	1.507	3.064	6.02	12.256
7	Production (million litr.) Sale of milk @ Rs.70/- litr.	0.427 2.98	0.854 5.96	1.708 11.92	3.416 23.84

Source: Feasibility document prepared by the author.

Table No.13 showing the summarized operational cost of buffaloes in the year 2013, at a farm (in millions Rs.)

Sr.#	Particulars	A-14	B-28	C-56	D-112
	Cost of Dairy Buffaloes @ Rs.90,000/- and/or @ Rs.1,20,000/-	 1.260 1.680	 2.520 3.360	 5.04 6.720	 10.08 13.440
	Operational Cost				
1	Labor @ Rs.9000/-	0.216	0.432	0.865	1.628
2	Green Fodder @ Rs.220/- per 40 kg @ Rs.180/- kg	 1.124 0.92	 2.250 1.840	 4.50 3.680	 9.000 7.400
3	Wheat Bhoosa @ Rs.150/- per animal/day	0.766	1.533	3.066	6.132
4	Medicines/Vaccines Att. Care/Service	0.030	0.050	0.080	0.100
5	Miscellaneous	0.040	0.080	0.120	0.240
	R&D	-	-	0.05	0.10
6	Total Operational cost	2.176	4.345	8.68	17.10
	Production of milk (litrs.)	0.051	0.102	0.204	0.408
	Sale income of milk @ Rs.80/- per litr.	4.08	8.16	16.32	32.64

Source: Feasibility document prepared by the author.

Table No.14 showing the summarized operational cost and income generated over previous years (in million rupees)

Sr.#	Year	Cost of Dairy animals/Buff. and No.		Total Operational cost	Income sale of milk	Savings
01	2002	14	0.42	0.46	0.92	0.46
		28	0.84	0.83	1.84	1.01
		56	1.68	1.60	.68	2.08
		112	3.36	3.14	7.36	4.22

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Sr.#	Year	Cost of Dairy animals/Buff. and No.		Total Operational cost	Income sale of milk	Savings
02	2004	14	0.45	0.54	1.23	0.69
		28	0.90	1.05	2.46	1.41
		56	1.80	2.08	4.92	2.84
		112	3.60	4.11	9.84	5.73
03	2006	14	0.63	0.67	1.53	0.86
		28	1.26	1.35	3.06	1.71
		56	2.52	2.75	6.13	3.38
		112	5.04	5.43	12.26	6.83
04	2007	14	0.77	0.55	1.53	
		28	1.54	1.11	3.06	1.95
		56	3.08	2.27	6.13	3.86
		112	6.16	6.60	12.36	5.66
05	2008	14	.84	0.72	1.78	1.06
		28	1.68	1.43	3.87	2.14
		56	3.36	2.90	7.15	4.25
		112	6.72	5.75	14.31	8.56
06	2009	14	0.91	0.78	21.24	1.51
		28	1.82	4.46	4.60	3.14
		56	3.64	2.86	9.18	6.32
		112	7.29	7.8	18.36	10.56
07	2010	14	1.05	2.22	2.55	0.33
		28	2.10	2.33	5.11	2.78
		56	4.20	6.90	10.22	3.32
		112	8.40	7.54	20.44	12.90
08	2011	14	1.12	1.01	3.06	2.05
		28	2.24	2.01	6.13	4.12
		56	4.48	4.07	12.26	8.18
		112	8.96	8.03	24.52	16.49
09	2012	14	1.19	1.48	3.83	2.35
		28	2.38	2.97	7.65	4.68
		56	4.76	5.92	15.33	9.41
		112	9.52	11.88	30.66	18.78
10	2013	14	1.54	2.17	4.08	1.91
		28	3.08	4.34	8.17	3.83
		56	6.16	8.68	16.35	7.67
		112	12.32	17.20	32.70	15.50

Source: Livestock Development Foundation® LDF, Islamabad.
The Authors Feasibility Documents.

Table No.15 showing the increase of prices of dairy buffaloes, green fodder, salaries of gawalas, wheat bhoosa, and Milk over previous years.

Sr. #	year	Cost of one Dairy buff.	% increase	Gawala Salary (PM)	% increase	Green Fodder (40 kgs)	% increase	Wheat bhoosa 30 kgs	% increase	Sale of milk (liter)	% increase
01	2002	30,000	-	3000	-	50	-	25	-	18	-
02	2004	35,000	20	3500	16.66	55	10	30	20	20	11.11
03	2006	42,000	16.66	4000	14.29	65	9.1	40	33.33	25	25
04	2007	50,000	11.11	4500	12.50	70	7.7	45	12.5	32	28
05	2008	60,000	20	5000	11.38	90	28.57	50	11.11	35	10.25
06	2009	65,000	8.66	5000	10.00	110	22.22	60	20	40	14.28
07	2010	70,000	7.7	6000	90.9	120	9.09	80	33.33	50	12.5
08	2011	75,000	7.14	6500	8.33	130	8.33	110	37.5	60	20.25
09	2012	80,000	6.66	7500	15.38	160	23.08	160	45.45	70	16.16
10	2013	90,000	12.50	9000	20.00	180	12.5	180	12.78	80	14.29

Source: Livestock Development Foundation ® LDF, Islamabad
Market rates (retail) of various markets of big cities.

DISCUSSION:

The Agricultural land, both irrigated and Barani, was different from each other, as is evident from table No.1, but most of the farmers preferred buffaloes instead of cows to be kept at their farms.

CONCLUSIONS:

1. Since the cost of animals (Dairy Buffaloes) salaries of labors/gawalas, cost of green fodder, wheat bhoosa, the cost of veterinary medicines and vaccines including miscellaneous expenditure on a farm are market linked hence the rate of milk per liter (the economic unit of 14 buffaloes has been successful over the years, w.e.f. 2002 onwards).
2. The Milk collection, rate of Milk Processing plants, used to be lower as compared to the prevailing market rate(s) of any area so the farmers directly supplied the milk to local markets on twice daily basis.
3. The operational cost although varied on yearly basis, those farmers who had their own farm land, sheds and dairy buffaloes, their feasibilities were cleared by the banks/financial institutions quickly and most of the farmers have paid back their loans in between 3^{rd} – 4^{th} year of the operation of their farms.
4. Some farmers provided concentrate feeds in addition to green fodder and wheat bhoosa/wheat straw, for more milk production and with good fat %age. In our feasibilities it has also been included.
5. When compared, the rise in the cost of 400 dairy buffaloes, green fodder, veterinary medicines/vaccines and miscellaneous expenditure, in all the four categories of dairy farms (A, B, C and D), the costs shooted up in the years 2007, 2008, 2009 and 2010 silently (without any hue and cry).
6. The feasibility prepared for Department of Agriculture Sciences, AIOU in 2010-11 has not yet been made operational.
7. The male calves produced each year can be grown at the farm for fattening, towards beef production. This will also generate income.
8. In all the feasibilities prepared, the principle of one gawala per 6-7

buffaloes was practicable and is working well in the farms established/strengthened, with funding, based on feasibilities.

9. Some farmers grow their own green fodder and they do not need to purchase it from the market, hence remain more profitable.

RECOMMENDATIONS:

1. All Livestock farms (both dairy farms for milk production as well as fattening calves for beef production) must be based on a technical feasibility, prepared on sound footings.
2. Since all commercial banks/financial institutions require a proper feasibility for financial assistance/credit/loan, this document must be prepared in accordance with the prevailing market rates.
3. Each feasibility must be prepared for at least 3-4 years and each year pay back of loan must be worked out clearly.

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THE INCREASING ENROLMENT OF AGRICULTURE AND LIVESTOCK SUBJECTS AT MATRIC AND FA LEVEL AT AIOU PAPER EVALUATION COMPARISON OF TWO SEMESTERS IN 2013

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ABSTRACT

This Monitoring & Evaluation (M&E) paper is an efforts made by the Agriculture and Livestock Group of AIOU paper evaluation, for Spring and Autumn-2013 semesters, encoded Groups No.2131 and 2279 respectively. The task of internal evaluation based on actual data, obtained from the daily script evaluation, of different codes of Matric subjects pertaining to Agriculture (211, 253, 254, 256, 257) and FA subjects codes (313, 326, 327, 328, 329, 342, 349 and two Additional subject 305 and 485, in any semester when required). A total of 13 bundles of 05 Matric codes comprising 3325 scripts were evaluated while 24 bundles of 07 FA codes comprising 6040 scripts evaluated in Spring-2013 semester along-with 02 bundles of one code-485 (BA), completing the total No. of scripts to 9496 (this also included 88 scripts of Matric and F.A, as self marking by the Head Examiner (H/E). The total remuneration of H/E, 13 SEs and Assistant was Rs.92,770/- deducting 6% tax of Rs.5120/- and net claim was Rs.87,650/- as per old remuneration rates of 2010-11. In August, 2013 semester work showed 05 Matric codes, spread over 09 bundles and 2340 scripts while 08 F.A courses spread over 35 bundles comprising 7807 scripts totaling 10355 scripts evaluated including 208 scripts as self marking by the H/E. The total remuneration of 13 registered SEs, one H/E and one Assistant as per revised rates (effective from July-2014) was Rs.1,92,868/- deducting tax @ Rs.6% of Rs.11566/- with net claim as 1,50,059/-. A significant increase of 09% ($P<0.001\%$) was recorded in the total number of enrolment and scripts in August-2013 when compared with the Spring semester 2013. The total number of Bundles (of all the MATRIC and FA codes) also significantly increased from 37 to 44 with a percentage of 18.91% when the quantum of August-2013 was compared with Spring-2013 Semester.

Key words: Paper Evaluation Agriculture Livestock Matric/FA subjects AIOU, Islamabad.

INTRODUCTION:

By the end of each semester, a final written examination is conducted by Allama Iqbal Open University (AIOU) for each and every subject code, throughout the country. The answer scripts are dispatched by all the centers and the Central Paper Evaluation System prevails at AIOU, HQs, Islamabad.

The principal author of this paper remained involved in paper evaluation since 1999, mainly in the Agriculture and Livestock Group and mostly in groups No.120, 1310, 1240, 1415, 1561, 1800, 1998, 2131 and 2279.This paper evaluation was initiated immediate after the launching of four (04) new courses, (two in Livestock codes 253 and 254 and two in Agriculture codes 256 and 257), both at Matric level. The Committee of Courses (CoC) and Faculty Board Meetings desired to see the response(s) of students at the time of enrolments and paper/scripts

evaluations. Under the prevailing system neither the enrolment nor paper scripts reach the Department concerned but it remains the responsibility of Departments of Admission, Examinations and Secrecy etc.

The only way to see the response of students is the time of paper evaluation and the group of S/Es, the H/E can be the one to do this job. The Agriculture and Livestock Group thus decided to make such effort and bring the facts to our readers, to be presented in any such forums as well as for research purposes as reference.

This paper remains limited to the comparison of Agriculture and Livestock scripts evaluated in Spring and Autumn 2013 Semesters. The work done is presented in tables 01 through 04 in the results.

Similar effort was earlier made by this groups, for the first time in the history of paper evaluation of AIOU [1]. As understood, each and every new course code when introduced is based on Survey Reports, Public demands, and target youth together with market utilization of such knowledge in future [8].

The courses in AIOU, like other teaching institutions, are subjected to chapter wise/units wise critical discussions, inclusion of recent information (the recent data and developments) not only in the new subject courses but also in the revised editions. This paper also endorses the objectives and the painstaking efforts including decisions of both the Academic Committees with the results that not only the enrolment has increased, at both Matric and FA level of courses but the interest of new students is towards increase.

The main objectives of this monitoring and evaluation was:

(i) To compare the enrolment of Agriculture and Livestock Courses at Matric and FA level, for only two semesters i.e. Spring-2013 and Autumn-2013.

(ii) The see the comparative paper evaluation work, the actual quantum of work done by the Agriculture and Livestock Group encoded as Group No.2131 and 2279.

(iii) To see the remuneration cost with the revised rates of 2014, as compared with the previous rates of 2013.

MATERIAL AND METHODS:

The compilation of data was a summarized approach taking complete and actual information from the following documents:

(a) The daily script evaluation proformas (duly signed by each S/E, the H/E and Assistant),

(b) The script confirmation proforma of each bundle of any code, when completed duly signed by the H/E with date.

(c) Each remuneration bill, of SEs, H/E and Assistant with claims of gross, and net amounts deducting 06% tax as revenue generation.

(d) Comparative approach was also made to see the remunerations, with old rates of 2009-10 and the revised rates of 2014 (taken from each bill).

RESULTS:

1. The results of our study for the spring semester 2013 (work performed in November, December-2013 and Janruary-2014) indicates five (05) codes of Matric and Seven (07) codes of FA including one code of BA-485 were evaluated, totaling 9896 scripts comprising 3325 scripts of Matric and 6571 FA scripts along-with BA 485 code as 443 scripts, as detailed in table No.01.

2. The collective remuneration of one H/E, 13 S/Es and one Assistant indicated gross claim of Rs.92,770/- and the net claim being Rs.87,650/- deducting an income tax @ Rs.6% as Rs.5120/-. The details of each examiner's work and individual remuneration, based on previous rates is detailed in table No.02.

3. The Results of our study of Autumn–2013 (the work done in June, July and August-2014) indicated that five (5) codes of Matric, spread over Nine (09) bundles, were evaluated with a total number of scripts evaluated as 2340. The eight (08) FA codes, spread over 35 bundles when evaluated totaled as 7807 scripts. Summarizing the quantum of 13 codes, spread over 44 bundles totaled to 10,147 scripts (inclusive self marking of 208 scripts) as detailed in Table No.03.

4. The H/Es and S/Es were required to be registered by paying Rs.500/- as registration fee hence all the 13 SEs and the H/E were encoded with their registration numbers, as shown in table No.04.

5. The remuneration charges of one H/E and 13 S/Es including one Assistant claimed collectively as Rs:1,29,642/-, after paying a tax of

Rs.1156/- (@Rs.6%) out of the gross claim of Rs.1,92,868/- (table No.4), in accordance with the revised rates of remuneration [3].

Table No.01 showing Quantum of work of paper evaluation of Matric and FA by Agriculture and Livestock Group in Spring Semester 2013 AIOU, Islamabad (work performed in November, December, 2013 and January, 2014)

A. Matric		
Code	Bundles	Paper
211	02	438
253	01	246
254	01	239
256	07	1868
257	02	534
05	**13**	**3325**

B. F.A.		
Code	Bundles	Paper
313	03	624
326	03	598
327	02	561
328	02	431
329	04	872
342	04	1007
349	06	1567
07	**24**	**6040**

C. B.A.		
0485	02	443
Grand Total		
13	**37**	**9453**

D. Self Marking
16+72 = 88

Source: H/Es Record of Agriculture and Livestock Group No.2131 paper evaluation of Spring- 2013.

Table No.02 showing the remunerations of H/E, SEs and Assistant for paper evaluation work at AIOU Spring-2013 Group No.2131. (work performed in November December-2013 and January, 2014)

Sr.#	Name of Examiner	Papers Evaluated	Gross Claim (Rs.)	Income Tax(Rs.) @ 06%	Net Claim (Rs.)
01	Dr. M. Hafeez Head Examiner	16+11%	16933/-	1016	15917/-
02	Iram Shahzadi Sub Examiner	3098	21529	1219	20310
03	Prof. Dr. Khizer Sub Examiner	659	9579	575	9004
04	Dr. Sajida Sub Examiner	737	7274	412	6862
05	Kinza Narjis Sub. Examiner	1734	9399	504	7895
06	M. Ibrahim Sub Examiner	486	4624	277	434

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Sr.#	Name of Examiner	Papers Evaluated	Gross Claim (Rs.)	Income Tax(Rs.) @ 06%	Net Claim (Rs.)
07	Aziz Ullah Sub. Examiner	147	1470	88	1382
08	Rabia Khurshid Sub Examiner	697	5787	349	5440
09	Bilal Mansoor Sub. Examiner	155	1635	98	1539
10	M. Ameen Sub. Examiner	236	2360	142	2218
11	Humeira Kabir Sub. Examiner	48	730	04	686
12	S. Anam Sub. Examiner	31	300	18	282
13	Nasira Parveen Sub. Examiner	521	4821	289	4532
14	Ishrat Mobeen Sub Examiner	160	1542	93	1449
15	Zahida Zahoor Assistant	9497	9497	569	8918
Grand Total			**92770**	**5653**	**87117**

Source: Head Examiner's Record Agriculture and Livestock Group, AIOU, Spring Semester 2013, (Claim as per AIOU, Rules).

Table No.03 Showing Quantum of work (number of bundles of various codes) of Matric and FA Scripts Evaluated at AIOU, Autumn Semester 2013, Group No.2279 (Work performed in June-July, and August-2014)

Sr.#	Code(s)	No. of Bundles	Total No of Scripts
		MATRIC	
01	211	02	413
02	253	01	229
03	254	01	238
04	256	03	881
05	257	02	579
	05	**09**	**2340**
		FA	
06	313	06	1110
07	326	05	1079
08	327	03	809
09	328	05	1036
10	329	03	467

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Sr.#	Code(s)	No. of Bundles	Total No of Scripts
11	342	04	970
12	349	05	1277
13	305	04	1059
	08	**35**	**7807**
Sub. Total	**13**	**44**	**10147**
Self Marketing			**208**
Grand Total			**10,335**

Source: H/Es record of paper evaluation, AIOU, Group-2279 for Autumn Semester-2013

Table No.4 Showing remunerations of HE and SEs and Assistant for the paper evaluation work done, At AIOU, for Autumn 2013 Semester Group No.2279 (work performed in June-July-August-2014)

Sr.#	Name(s) of Examiner	Examiner Regd. No.	Total Scripts Evaluation	Gross Claim (Rs.)	Income Tax (Rs.)	Net Claim (Rs.)
01	Prof. Dr. Khizar Hayat (S/E)	469	1049	12422	745	11677
02	Iram Shahzadi (S/E)	379	3343	45191	2710	42481
03	Bilal Mansor (S/E)	1492	662	9103	547	8556
04	Shabnam Kayani (S/E)	2080	1365	18726	123	17603
05	Qurat-ul-Ain (S/E)	2053	1154	15018	901	14117
06	Nasira Parveen (S/E)	1779	456	6113	366	5746
07	Kamran khan (S/E)	2074	217	3615	217	3398
08	Rabia Khurshid (S/E)	485	455	6305	378	5927
09	Ehtisham Rahim (S/E)	2090	659	8086	485	7601
10	M. Ibrahim (S/E)	456	227	3055	183	2872
11	Sumera Saeed (S/E)	1990	186	2983	179	2804
12	M. Shahid (S/E)	1966	96	1351	81	1270
13	S. Tahir Husnain (S/E)	1965	432	5945	356	5389
14	Dr. M. Hafeez (H/E) + self Marketing	413	054 13+12 pkts	31243 8292	1875 495	29368 7798
15	Zahida Zahoor Assistant	-	10301	15420	925	14495
	Matric+FA+ MSc(Hons)		10301		11566	150059

Source: H/Es Record of Agriculture and Livestock Group No.2279-AIOU Remuneration as per revised rules 2014.

CONCLUSIONS AND RECOMMENDATIONS:

Conclusions:

1 A significant increase of nine percent (09%) was seen in the total enrolment as evaluated through the number of answer scripts just in one semester, when compared with the quantum of August-2013, over the Spring-2013.

2 There was also an increase of the total quantum of work from 37 bundle of both Matric and FA codes in Spring-2013 to 44 bundles in August-2013 when compared.

3 Although the Agriculture and Livestock courses are not compulsory courses like English, Islamyat, Pak. Studies, yet the increase in enrolment (admissions and sitting in final examination of any semester) and scripts evaluation shows the interest of new students inclined towards these courses.

4 The revised rates of remunerations of 2014 has showed a sigh of relief and long awaited demand completed of SEs, H/E and Assistants.

RECOMMENDATIONS:

i. Most of the students still need counseling for the choice of enrolment in Agriculture and Livestock subjects.

ii. It is felt by the subject specialists of Agriculture and Livestock (H/Es, the S/Es and the subject experts) in the Department of Agriculture Sciences of AIOU to revise the subject books, putting in recent information and fresh data, as we have now entered in the year 2014 and onwards.

iii. The rates of remuneration, per script, is still far less than the FBISE Islamabad [08] and the Education Directorate of Rawalpindi Region rates which need to be further enhanced.

iv. The conveyance allowance which used to be allowed to H/Es, S/Es and Assistants @ Rs.150/- and Rs.125/- respectively, prior to 2010-11 needs to be restored which will not only financially support all the H/Es, S/Es and Assistants but the quality of paper evaluation will also improve.

DISCUSSION:

This paper will not go into the detailed discussion of any irrelevant things but some indications need to be elaborated. The increase of enrolment is not too fast, rather it is steady and with the positive acceleration. When compared with previous similar study [1] conducted in 2012, when a comparison was made in four (04) semester's work. The total number of scripts was 6182, 9462, 10662 and 11300 in semesters Spring 2010, Autumn 2010, Spring 2011 and August, 2011. In the current study the comparison is made between two semester i.e. Spring 2013 and August, 2013 semesters. In which the total number of scripts were 9896 and 10,385. We can observe fluctuation of enrolment, as seen though the paper evaluation. The factual position is that both Matric and FA programs comprise of four semester's work. It is totally a discretionary choice of the students as to which optional courses might be enrolled.

The rates of enhancement for evaluation of one scripts of Matric from Rs.09/- to Rs.13/- and Rs.10/- to Rs.14/- for FA scripts, is not only a positive effort of all Committees and the Competent Authority which is appreciated. But it is still far less than the remunerations of FBISE, Islamabad where remuneration of one script of Matric is Rs.25/- and FA/FSc is Rs.30/- as detailed in the Notification [5]. These revised rates are also far less than the remuneration of Directorate of Education RWP Region where the rates of marking/evaluation of Matric paper is Rs.28/- as notified in their 2012-13 Notification [6].

The group of Agriculture and Livestock in our previous paper [1] recommended the restoration of conveyance allowance which used to be allowed to H/Es, S/Es and Assistants @ Rs.150/- and Rs.125/- respectively per day but was stopped in 2011-12 due to reasons unknown.

Such studies are required to be conducted in various other groups of subjects, on Random bases, to evaluate the group tasks and make it presentable to various forums of AIOU for further streamlining the process towards improvement.

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STRESS FACTOR IN LIVESTOCK CAUSING ECONOMIC LOSSES

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ABSTRACT

This review article encompasses various conditions causing stress to domestic animals, specially the dairy animals (cows, buffaloes, sheep and goats) in any locality of the country. These conditions comprise changes in environment, humidity, heavy rains, floods, transportation, high and low temperatures, housing bedding and various diseases. Economical losses as observed in the year 1992-1999 and 2006-07 including 2011-12 and data collected, has been reproduced, with recommendations to the farmers and farm owners.

Key words: Dairy animals Stress factor Economic losses Pakistan.

INTRODUCTION

Stress is a condition that disturbs living beings such as humans and animals. The category of animals comprise cattle, buffaloes, sheep, goats, poultry, wild animals and birds, stress by definition means any action, different than normal which affects the productivity and health of an animals is categorized as stress. Practically stress means anything or action which disturbs normal routine of an animal.

The reader(s) will also get mediocre information on various cases of stress that affects adversely the health and productivity. We are also going to discuss how far the stress becomes a major cause of economic loss to farmers. Our experiences, observations and some related evidences pointed out by our colleagues (in various Seminars/Symposia/Conferences and Workshops etc.) are also being put forward.

In the coming paragraphs we will discuss various kinds of causes of stress, resulting in adverse affect on the body of the lactating animals, specially cows and buffaloes. These causes comprise change in extreme temperature ranging from 40°-60°C centigrade in the month of June and July of summer season while the cold temperatures of 3° to 5° or even less. We will also discuss humidity, including floods and starvations, etc.

We are also going to discuss in the coming paragraphs the stress caused by external parasites, the ticks, mites and flies (both Bot and Stable flies) etc.

Separate paragraphs are also available for the readers on the very social behaviour and the adverse conditions like continuous tied-up condition, no fellow

animals in the vicinity, disturbed normal routine(s) of animals, the increasing gap in feed and fodder supply including drinking water etc. These few related causes of stress have also been jotted down by the Senior Officers of SLSP in their write-up for farmers by Saeed *et al* 2008 [1] in Urdu. In the light of their observations made during 2003-04, 2004-05 and 2006-07 at various farms, throughout Pakistan, where stress was noticed. A possible remedial measure also recommended for farmers. Economic losses due to stress were also indicative but not worked out.

Our approach in this article will be towards actual economic losses faced by the farmers and lastly culminate in recommendations and message to the farmers diverting their attention towards remedial measures to be adopted for improvement in the milk and meat production.

MATERIAL AND METHODS

The following material/reports were excessively consulted for the preparation of this review/status paper on stress factor in livestock:

i. The text book on livestock production code-786: Livestock and Environment, AIOU, book series.
ii. Annonimous (2000) livestock production and health information (TAD-info) recommendations by FAO-APHCA at KASESART University, Thailand.
iii. Annonimous (1995-96) Maintenance of environmental temperature for imported Friesian cattle, maintenance and protocol document, CBD Farm Harichand, Charsadda.
iv. National Geographical Series, (2006-2007) (2007-08) (2008-09) and (2009-10). Animal World; various TV channels.

Causes of stress, due to extreme temperatures, humidity and altitudes.

High Temperature: Experience has shown that when there is scorching heat in the months of June and July (each year), prior to monsoon rains, the animals seek shelter in shades. In the plane areas of Punjab and Sindh the buffaloes specially, spend more time in water ponds. It has also been observed that in most of the organized farms there is a routine of sprinkling of water on buffaloes which has not only improved the body condition, the health status but also there are reports where increase in milk production has been documented as ½ to one liter per day (with this practice) as laid down in the annual reports of Livestock Production

Research Institute (LPRI) Bahadur Nagar Okara 1998), (2000), (2002), (and various paper presented in recent workshops (2004) and (2005) [2]. It has also been advocated in various thesis Research conducted at other Institutes such as Institute of Animal Physiology and Reproduction Bhunikey, Pattoki (1996-1997), Final Report of TCP/PAK/Assistance in Milk processing and supply in Punjab [3]. In most of the Govt. and private farms, such as the Cattle Breeding and Dairy Farm (CBDF) Harichand, Charsadda DLDD, NWFP (Khyber P.K) and Arifwala farms in Punjab. There is a routine of Sprinkling of water in imported Friesian cows which improve milk production. Annual Reports (1992-93) (1994-95) [4].

Experience has shown that both milch cattle (cows) and buffaloes did not show their production potential in scorching heat and high rise of temperature in summer season in Pakistan and their neighboring countries, until the environmental temperature is reduced. Many documents exist in libraries in which our eminent Scientist namely Prof. Dr. Abdul Rasheed Chaudhry, the ex-principal of the then college of Veterinary Sciences (now the University of Veterinary and Animal Sciences (UVAS) Lahore and Prof. Dr. Manzoor Ahmed the Ex-Vice Chancellor UVAS have contributed a lot in Buffaloes Production, reproduction, behavioral attitude and environmental factors. The lists of publication are available in CVs of both the scientists and are available in various publications (books and journals specially Pakistan J.Vety.Sc various volumes).

We remember a famous sense of humor about Dr. Abdul Rasheed Chaudhry when he traveled from CVS Lahore in the year 1987-88 for his interview for the post of Professor (B-20) in the University of Agriculture, Faisalabad, he carried a Load of Books and Publications weighting not less than 40-50 kgs and managed to drop it on the door step of the place of interview. The Selection Committee was already convinced by the caliber, qualifications and the international fame of Dr. Abdul Rasheed, one of the Committee Members asked him, who is the person supporting him, from the high-ups, for this post" He said, "the person is sitting out side, the door of this committee room".

The load of books was tied-up in a white sheet of cloth as "GATHRI" and was examined by the members of the committee one by one. These were the Books and publications, proceedings of seminars/workshops/conferences in which he

participated and presented his research papers, which is a record. Most of his work was on buffaloes in South Asia. The high rise of temperate has always affected the productive capability and potentials adversely. Low production of milk, decreased body weight, (low weight gain) and stress has resulted when directly under the attack of high environmental temperature.

In the months of December to mid of February, in plane areas while November to March in hilly areas the environmental temperature being 4°-5°C in the last week of December and January till mid-February, each year, in Northern Punjab, and now Khyber P.K North Western Balochistan are the worst experienced days for livestock specially milch cows and buffaloes.

Animals are not brought out of scavenges prior to 9:00 a.m. in the morning and are take inside sheds/houses before sunset. Milch animals need special attention for production against chilling cold. Extra quantity of nutritional feed and fodder is provided in the form of concentrate mixture(s). The animals are is the state of stress and this environmental change adversely affects the productivity both in terms of milk and meat.

Stress due to starvation: Experience has shown that starving domestic animals, specially the milch cows, buffaloes, sheep and goats, has rendered these animals in the state of distress, anger, reaction, and stress. This has not only resulted the precious animals weak but also has led towards debility, ailment and cachexia.

By Neglect: Some times it happens that by mistake a single animal is deprived off feed and fodder at one or both times a day. Certainly no human being will be cruel enough to keep his or her domestic animals off feed. This can only be possible when negligence is observed by the farmers or animal attendants. There can be many reasons but this is one of the causes of stress leading to starvation. The majority of cases were reported in emergencies and holidays.

By Mistake: It has also been observed and experienced that a sudden drop of milk production in a dairy unit of cows or buffaloes was reported. This happened many times at a single farm or different farms. The animals were examined, no apparent sign of clinical or contagious disease was observed but the animals were loosing wt. debilitating, manger empty, animals looking sad and sometimes angry, just FASTING, Rumens were empty, upon enquiry, it revealed that the animals

were not provided with feed and fodder twice. The reasons were known and the replies to the quarries were all beating about the bush.

Economic Losses

This condition of stress reduced milk production upto 50% or more. In one farm (the six buffaloes producing 60 liters of milk per day), it was in 2003 when the milk price was Rs.20/- per liter, gave a direct loss of Rs.1200/- per day to the farmer owner. This economic loses can be worked out today when the sun of 2014 has risen and the price of milk is Rs.90/- per liter, in Rawalpindi-Islamabad twin cities. Such personal observation indicate how far the negligence and mistakes affect milch animals in a Single day [5], [6], [18] [19].

Stress due to drought: Report on the impact of drought is documented in various journals, in various reports and has been discussed in various national, regional and international seminars/symposia/conferences/work shops. Data from Rahim Yar Khan Tharpaker, Bahawalpur, Dera Ismail Khan, Cholistan Areas, parts of range areas of Balochistan and Sindh have always been pointed out the adverse affect on animals by drought. (In deserts and ranges where water availability is rare and scanty). Reports of debilitating domestic and wild animals (including starvation and death of many animals) have not only been documented in the print medium but electronic media of TV, various channels always present documentary movies on how the domestic and wild animals survive in droughts of African Countries [7] [8]. In drought conditions, the animal is in a real stress. The animal cannot exploit its potentials of body growth, it is under-nourished, always starved, the body requirements f proteins, carbohydrates and other vitamins and minerals are not completed. Over and above the volume of water intake is far less as compared to normal requirements. There is always room for influx of various bacterial and vial diseases, due to less immunity developed against such ailments.

The after math of the drought: The result being (i) low production of milk and meat, (ii) fall of hair in cattle buffaloes, goats, horses and donkeys while (iii) fall of wool, low meat/Mutton Production (iv) low rate of reproductively in sheep and camel has always been observed (v) increased rates of prevalence of bacterial, viral, parasitic and metabolic disease and (vi) calf mortality including clinical syndrome of (vii) malnutrition (viii) abortions (ix) red water and other ailments have been repeatedly documented in reports from the drought hit area.

This is a main cause of stress to the animals in the year 1997-98 an emergency was declared in the Livestock Dairy Development Department, Quetta as most of the areas were badly hit by drought. The water belt was lowered to 300-350 feet. There were very lessens and the MINFAL GoP under a TCP project, provided green fodder for sheep and goats of drought hit area. The quantity of green fodder supplied was 10-15 million tons in weekly (phased) tranches, through Pakistan Railways. Simultaneously drinking water was supplied to various parts of Balochistan again through Pakistan railways, on weekly basis. Water tanks were made available to sheep and goat farmers on the rail-road-sides, with a distance of2-3 km apart or very close to drought hit villages. Both human beings and their livestock were saved from thirst and starvation. The TCP-project report (1998-99) is available in MINFAL, now MLDD, GoP, Islamabad and the DG, LDDD Balochistan [9]. The by-products will also fetch low price due to bad quality specially hides, skins and casings including bones, throttles and offals. Hair of goats and wool of sheep will show low production, will be of low quality and will fetch low price.

Economic Losses

In a situation like the one stated above, in drought hit areas the economic losses are tremendous and without exaggeration which are (i) Daily loss of milk of not less then 50% of both cows and buffaloes (ii) Daily loss of wt. gain, as no feed no growth (iii) Deteriorating physique of the animals (iv) Low potential of immunity against endemic diseases (v) Increased incidence of diseases (vi) Symptoms of malnutrition result in debilitation, weakness and hide-bound condition of animals leading to cachexia and death (vii) The animals, when slaughtered will give less carcass wt. (low meat production).

Scarcity of drinking water: This condition has always resulted in a state of stress to the animals. Livestock farmers in well organized farms MUST make arrangements and ensure its availability 24 hours to the dairy animals both cattle and buffaloes. Drinking water is equally important for sheep, goats and poultry birds. Observations and experience has shown miserable conditions of domestic animals without drinking water. While the condition of grazing animals in areas where there is scarcity of water requirements, is interesting. Repots from Thall,

Bahawalpur, Cholistan Tharparker, Dadu, Lasbela, Mekran, Qalat and other areas in the country where animals graze hundreds of kms away from main water sources (rivers, canals, streams, wells and ponds etc). Inform that they appear to be in great stress. Symptoms like licking walls, stones, wood, charcoal, leaves and sand with sluggish movements, dirty lacrimation and discharges form eyes, dry muffle, some times dribbling of saliva, and roughend skin are observed.

Clinically these animals are badly dehydrated, unable to work, weak stature, lowered body activity low respiration, low pulse rate and most of the times, low heart beat, comatosed conditions followed by death.

In the early stages when the animal is thirsty, if one time water is not provided/not available due to many reasons, even in the organized farms, in case of Electricity shutdown/discontinued for time being, may be for 8-12 hours, you will see that animals might drink twice the volume of water which was used to drink at ONE TIME.

Economic Losses

In scarcity of water, the conditions mostly observed, resulting in economic losses to the livestock farmer/owner are (i) Low milk production (ii) Low wt. gain (iii) lower rate of meat production (iv) lesser activity of the animals (v) low reproductive rates (vi) increased rate of miscarriage or abortions and (vii) increased rate of incidence of bacterial, viral, parasitic and metabolic disease.

Cruelty to animals
A continuous stress to animals

Various categories of work power/draught power is available to mankind, from animals, to the exaggerated extent. Observation and experience with conditions reveal that most of the time, either due to a set routine of the animal owner, or by neglect in continuous ignorance due to lack of awareness and education; the animals are bound to stress conditions.

In the recent past ploughing the fields, Tonga ponies, the pulling bullock of carts, the camel ridden "rehras" the donkey pulled carts/barrels of kerosene oil etc have been some examples of animal draught power. In some big cities, these have been reduced to some extent. In rural areas even buffaloes and cows are being used for draught power but to lesser extent. Some examples still exist in taking mechanized water from wells for irrigation purpose, using bullocks and/or camels.

Let us discuss when such activity becomes a stress or a continuous stress for animals with the following factor, what adverse affects can be expected.

Pulling cartloads: We understand that a certain load is recommended by the society for the prevention of cruelty to animals (SPCA), a Lahore base society established in early sixteen and still functioning. The filled operational force uses to catch. Such culprits, confiscate the licenses of the accused and a decision is made to the amount of FINE to be imposed on the cruel owner, depending on the type of offence and stage of cruelty done to the animal, under the SPCA-Act 1963.

The rates of SPCA FINES were revised in the year 1993-94 by the MINFAL GOP, Islamabad. There are at least 16-17 various sections of the SPCA-Act 1963 under which most important are (i) over loading (ii) over-work (iii) bruises (iv) wounds (due to saddles, reins, including ropes) (v) various categories of injuries (due to lashes, beating with sticks etc.) (vi) using aged animals or (vi) very young animals in work (vii) empty stomached work (viii) using apparently sick or diseased animals for work (ix) using sick or weak animal for drought power (x) using least power animal for extra ordinary load etc. These are continuous sources of stress.

Economic Losses

The animal owner understands to take work out of his/her animal but killing of an animal with forced cruelty is not only an economic loss to the owner but it is an offence. We can also categorize the losses as (i) an animal can be used for work for a certain period of time and then REST is needed, with Ad. Lib. feeding and watering, after say 3-4 hours continuous work, the animal is exhausted. In repeated cruelty, the animal lies down and sometimes leads to death (ii) in another instance little bruises if not subjected to rest, medication and animal health care, the ailment increases. The condition worsens and continuous work might lead to further diseased condition with more medication and cost of animal health care required (iii) a small deviation of body temperature, if neglected and over looked, within few hours it becomes high rise of temperature and the animal becomes off feed and diseased. This will provide the cost of medicines and no work losses to the owner.

Stress due to changes in normal routine of animals: The animals have been observed in the state of stress when a routine of normal life of the animal changes,

e.g. there is delay in feed and fodder offering, there may be delay in water intake and/or there is lack of exercise. Such change put the milch animals both cows and buffaloes, including sheep and goats in a state of stress. This also provides economical losses to the farmer/owner. The losses thus exerted in financial terms have many times been calculated; hence it is imperative for a farmer to be vigilant, alert and must take care of his milch cattle and buffaloes for proper management. Changes are a sudden change in the normal routine of can be express as under:-

Delay feed and fodder: Observations and experience has shown that animals feed with delayed times fodder supply (as discussed in earlier paras starvations by neglect or by mistake) immediate adverse affects are observable in terms of debilitated condition loss or lower production of milk and empty stomach etc.

Once, the routine is disturbed, the loss sustained for 3-4 day until normalcy e.g. there were 14 buffaloes in one of the client's farm. The milk production was 130-140 liters per day. The matter was called to investigate on Eid Days in 2005. The complaint was decreased milk production animals in great stress, mangers were empty, no stock of green folder for the Eid-days. Upon investigation the guess became a reality. The animals were not fed properly, both the cattle attendants sold the stock of wheat bhoosa and the green fodder of 14 buffaloes to neighboring farmers/cattle owners and left the farm. Immediate arrangements were made to feed the buffaloes ate lavishly, as these were hungry or the last three (03) times. The milk was reduced to 50% in the evening milking while only $1/4^{th}$ milk in the morning of Eid. Water supply was restored. After two days and feeding, plying open yard and taken out twice for grazing with continuous provision of concentrates, the milk obtained in the evening of Eid was 3 liters/per buffaloes which increase by 4-5 liters, the next day on 3^{rd} day 5-6 liters or more per buffalo. The restoration of animal's milk was regained on 4^{th} day of Eid.

Economic Losses

This example, on observation was based on a stress caused due to change and gap in routine fodder supply (when disturbed). The owner calculated a loss of not less than Rs.8000/- daily as the rate of milk was Rs.25/- per liter (farm rate). The green fodder being @ Rs.60/- per 40 kgs and wheat bhoosa used to be Rs.65/-per bundle of 35 kgs in those days of 2005.

Stress due to inconvenient housing Space (congestion and overcrowding)

A complete chapter appears in publication "Livestock Industry" Code 782 written for M.Sc(Hons) Livestock Management students of AIOU in 2006-07 in the light of HEC's recommendation of courses, the similar approach was re-cost in "Livestock Industry" by Muhammad Hafeez (2011).

That portion related to this aspect needs to be studied in detail which describes the summarized contents including location, farmstead arrangement, building, requirement, environmental control and to her details Hafeez. M. (2007) [10]. If there is any deviation in the space requirements, per animal or if there is congestion of cows or buffaloes in one shed. The animals are under stress. The animals cannot more properly: there is difficulty in sitting and/or sleeping-while-sitting. The adverse affect of this type of stress disturbs the free living or free movement of the animals in a shed or open yard. The result is evident. The animals is not in comfort and productivity of the milch animals is adversely affected, resulting into the economic losses faced by the farmers.

Economic Losses

In such conditions the Economic Losses are (i) low milk production or decreased milk production (ii) lower rate of growth/slow growth in body wt. (iii) loss carcass wt. after slaughter (iv) comparatively less active (v) sometimes the animals start fighting (vi) the living of animals become dis-organized (vii) proper watering or feeding becomes difficult (viii) individual examination of health of animals becomes difficult.

Stress due to various categories of diseases and in convalescence

Although we have already discussed various endemic diseases of bacterial, viral, parasitic and metabolic origin elsewhere but stress aspect was missing. Without going to anther duplication let us only confine ourselves to see how stress is observed in different diseased condition.

Stress due to bacterial diseases

We can easily categorize bacterial diseases, based on our previous knowledge of DVM specially the subject of Microbiology, Pharmacology and Veterinary Medicine both clinical and preventive as (a) bacterial diseases which prevail for a short time (b) bacterial disease which prolong in duration.

The diseases which show short incubation period and quick clinical signs include Hemorrhagic Septicemia (HS), Black Quarter (BQ), Anthrax, Tetanus, Botulism, Bacillary, White Diarrhea of Calves (BWDC), Colio Bacillosis (E.Coli Infection), Bacterial Pneumonia, Bronchitis, Septicemic conditions, Samenellosis, Shigellosis, Mastitis, abscesses and wounds.

In these kinds of infections the animals shows to be under stress. The clinical signs mostly recorded are (i) animals are often off feed (ii) there is high rise of body temperature (iii) the animals are constipated (iv) the animals become in-active (v) animals are reluctant to move (vi) most of times, the animals lay down (vii) digestive disorders prevail until, treated (viii) skin, muffle and muzzle remain dry (ix) pulse rate and heart beat is fast (x) low or decreased milk production (xi) some times No Let-down of milk (xii) in case of no treatment, death occurs (xiii) one can easily watch this victim from a far away place (xiv) immediate animal's health care services with treatment of choice be resorted to save the animal (xv) in case of anthrax, no treatment.

Economic Losses

From the above paragraphs one can easily conclude that (i) there is no milk production. This is a direct loss to the farmer (ii) since there is no intake of feed/fodder, there is no growth and body wt. gain (iii) in case of treatment and animal health care, cost is again a financial burden on the farmer (iv) immediate after relief of symptoms, the convalescence starts (the phase of total recovery from disease and stress to the state of normalcy) (v) the convalescence period is form 2-3 days to a maximum of 8-10 days, depending on the severity of the attack of diseases (vi) the potentials of milk and meat production are disturbed until re-vigorised with treatment/animals health care, nutritious balanced diet (of feed and fodder) plus vitamins.

The diseases which have prolonged duration of incubation period and appearance of symptoms in weeks and in months, include Brucellosis, Turberculosis, Salmonellosis, Talmonellosis, Leptospirosis, Erysipelothrix, Actinobacillosis, (Lumpy Jaw), Actionmycosis (Wooden Tongue), Corynebacterial Infections, Helminthic Infestations (of Nematodes Trematodis and Cestodes) of different intensity, including chronic cases of infections like sinuses and fistulae, increasing

abscesses, Foot Rot, Tumours, Haematomas Ticks and Mites Infestations and ascities etc.

In such diseases the animals especially milch cows and buffaloes are in a continuous stress. Proper diagnosis, quick start of treatment, Good Management Practices (GMPs) and ensuring hygienic conditions, may lead to avoid stress, in a herd at the Livestock Farm.

The main clinical signs observed is such diseases are (i) the animals are not active (ii) the animals remain away from the herd, in the shed or in open yard (iii) the animals show in-efficiency in grazing (iv) the milch animals produce decreasing quantity of milk (v) in most of the diseases, there is rise of body temperature, just by 01°c or 1.5°c (vi) the animals cannot go for routine 2-3 km walk or height exercise in the farm (vii) laboratory test is the only diagnosis which will reveal the disease (viii) in some diseases, specially Brucellosis, Leptospirosis and Coryne-Bacterial infections, there is history of abortions (ix) in case of abscesses, sinuses & fistulae, the animals are unable to sit or move properly (x) in case of no treatment, the number of diseased animals is increasing, in days and weeks (xi) in helminthic infestations, there are always symptoms of diarrhea (xii) in cases of ticks and mite infestations, the animals are in a real stress. The ticks are sometimes so pearcing in the skin (sucking blood) that these are removed with the help of forceps.

Economic Losses

Once we have diagnosed the clinical manifestations of the disease of prolonged duration, stress to the animals specially milch animals at Dairy Farm, we can easily understand what economical losses can be faced by the farmer in monitory/financial terms. These are (i) decreasing trend of milk production (ii) decreasing trend of body wt. gain (iii) the animals cannot show its real potential (iv) the disease(s) must be spreading with passage of days and weeks (v) in case of No. treatment by negligence or care less ness, abortions continue (vi) in case of no treatment, the animals must be culled and slaughtered (vii) the young stock is always at risk (the future asset of the farmer) (viii) a single sick/diseased animals may spoil the whole herd giving a financial set-back to the farmer (ix) a farmer with the history of such diseases will not get good name in the market and the buyers

will go to another breeder farmer (x) the milk of a diseased animal will spoil the whole lot of milk, in few hours and may cause human health problems in a locality (xi) once identified, the market milk purchaser will refuse to take such milk and the farmer will get a bad name in this trade (xii) laboratory test must be carried out in such cases, so that all animals are screened out and avoid losses.

Stress in convalescence

Convalescence, after treatment in bacterial and after the completion of the course of viral disease, (if after all, the animals remain alive) e.g. in Foot and Mouth Disease, stress is observed in initial 2-3 days and up to 7-8 days in milch cows and buffaloes.

This can well be judged, based on the frequency of improvement and reaching the state of normalcy of an animal, passing through the diseased phase of its life. The state of stress in the categorized improvements, after an animal has gone through a clinical diseased syndrome (i) the animal will slowly improve toward ad. Lib. Feeding because it is under stress of body aching, rheumatism, weakness, also metabolism, improvement and healing of internal wounds and body tissue normalcy, after febrile conditions(s) (ii) the initial production potential will take 2-3 days as a minimum and 5-6 days at a maximum in bacterial disease convalescence and upto 9-10 days in viral disease(s) while the peak production potential might take 3-4 weeks (iii) the body movements, the normal walking in the paddock and light exercise of 2-3 km one way walk, might not be possible due to stress and temporary debility (iv) The stress may continue until the blisters and wounds heal-up. The healing of wounds both external and internal take their natural course of time. The external wounds take 5-7 days for healing while internal wounds take 14 days to 21 days as minimum time for normal wounds (without involving physical locomotion).

Stress due to viral diseases

Viral diseases causing economic losses to the farmers which are endemic in Pakistan have been involved as causing the stress. It is emphasized that most of the viral disease, are just killer diseases like Rinderpest, Rabies, the PPR in sheep and goats. In these, stress is seldom observed, recoded and no animal survives in the wake of out breaks: The only disease(s) that do not kill the victims in our area are Foot and Mouth Disease (FMD) and Pox, may be Bovine Viral Diarrhea (BVD).

The clinical manifestation of stress factor can be seen in the stages of FMD in Cattle and Buffaloes as (i) the first -2 days are initial stages when the symptoms appear with high rise of body temperature (ii) small blisters appear on the tongue internal buccal/cavity, and coronary band of soft tissue of the hoofs, as swollen and inflamed (iii) the stress phase is in peak when that animal cannot eat, cannot drink, cannot walk and cannot move (iv) there is no production of milk (v) the animal remains in real tension and stress during the diseased Phase (3-4 days) (vi) the animal is provided palatable diet (leafy vegetables, fodder broken in pestle and mortar with molasses, milk and butter).

The symptoms continue until 5-6 days when with the continuous animal health care (washing of mouth and feet with antiseptic solutions and application) and medication to check the secondary infection, the disease takes its course of time. No death due to FMD has been observed, and at least no such report of death due to FMD has been evidenced in the published material in Pakistan. After 6^{th} to 7^{th} day the convalescence starts, in FMD and improvement signs appear. (The animals stand up but unable to walk, start eating with difficulty, little milk production also starts) but the animals both male and female) are still passing through stress. This phase is also critical. The animals need rest, nourishment and not forced to work or walk (for routine walk for grazing), until the animal gets on its normal routine.

Economic Losses

These have been discussed and calculated with rate of milk in accordance with market rates, the cost of medication and animal health services. If the total loss of milk in 3-4 days (completely no milk), after 4-6^{th} days 50% loss of milk and -8^{th} or 9^{th} days, loss of milk was @ Rs.45/- per liter of a buffalo giving ten (10) liters of milk per day in the year 2007-08, was Rs.4750/-. This gross economic loss in the year 2009 @ Rs.50/- per liter of milk with new costs of medicine and animal heath care for 3-4 days was recorded as Rs.5,600/- per animal.

Caution/message to farmers

It is always advocated and call upon farmer brother, if they can go for FMD vaccination which costs Rs.60-80/- per animal while imported one may cost

Rs.120-140/- per cow/buffalo, the loss of Rs.5000/- to Rs.6000/- per animal can be avoided.

Stress due to change in environment

Changed environment keeps the animals, specially the milch cows and buffaloes, in stress, until and unless the environment is made friendly, the production potential of a cow or buffalo cannot be achieved. The environment of an animal includes all situations surrounding them including housing, bedding, humidity, owner/farmer the new attendants, new gawalas, the attitude, the flow of winds, temperature, intensity of rains and floods etc.

Observations have been made; various reports have been consulted, at home and abroad, to note that not only large ruminants (milch cattle and buffaloes) but also small ruminants (sheep and goats) including poultry birds were found under stress due to change in environment, A sudden change in climate, (in both controlled and un-controlled housing), the comparative studies, have been conducted and results published. We must discuss each and every aspect of change in environment and see what is the adverse affect on an animals production potential, in terms of milk and meat.

Humidity: Despite sufficient housing facilities, both in controlled and open sheds, humidity has also played important role in exerting adverse affect on the production potentials, of large ruminants specially milch cows and buffaloes, as (i) when humidity is increased there are always complaints of respiratory disorders like difficulty in breathing, dispnea, infections of bronchi, pneumonia and asthma (ii) the animal does not eat lavishly and feels awkward in showing normal body activity (iii) apparently the animal will be healthy but clinically in great stress (iv) the animal exposed to humidity for a longer duration will result in some other metabolic complications such as increased lactic acid deposition in the muscles and joints resulting in rheumatism (v) the uric acid which other wise could be released through skin and urine, with normal body temperature and normal humidity, is retained in skin, body muscles, and joints and may cause Urolithiasis and ketosis (vi) similarly oxalates do not excrete with normal sweat but urinary system shoulders this burden (vii) in increased humidity, there is less water intake and normal metabolism is disturbed (viii) there is decrease in milk production and

stunted growth if continuously exposed to abnormal/increased humidity (ix) there is less availability of oxygen, in increased humidity hence the de-oxygenated (inspired) air will result into lowered/decreased wt. gain (x) this will result in ultimate low milk and meat production (xi) thus the production potential is adversely affected [11] [12].

Rainy season has always shown a condition of stress to milch cows and buffaloes. Experts of livestock management say that the wet cold has 27 times more painful affect than the dry cold. Experience has shown that an animal may withstand cold climate and cold environment but when the rain drops are poured on the animal (even a sprinkle or a drizzle), will cause stress and next morning the animal will show high rise of temperature and ailment which will require immediate animal health care and medication.

In rain the animal cannot go for a walk, cannot graze, the humidity is increased and all after-math of humidity in environment becomes disadvantage for an animal. There is mud all around and animals are not that active which otherwise would have been. The normal body immunity is also lowered, due to stress ,so it is highly recommended that the animals must be vaccinated against seasonal and endemic diseases specially before the Monsoon Rain [13] [14] [15].

Unvaccinated animals, mostly lactating cows and buffaloes, have always been observed the victims of hemorrhagic septicemia (HS) Black Quarter (BQ), Enterotoxaemia (ET) and Foot and Mouth Diseases (FMD) while the vaccinated ones, prior to rainy season have very rarely shown the on-set of these diseases [3] [16].

Similar is the case in sheep and goats, if not vaccinated prior to Mansoon rains, these have always been found victims of ET, and Contagious Caprine and Ovine Pleural Pneumonia (CCOPP), as recommended in various seminars/conference at home and abroad.

Economic Losses

No doubt, the bacterial and viral diseases are endemic in our country but the stress has always played its key role in lowering the immunity of animal body. The precious animals can be saved to avoid monetary losses to the livestock farmer which are spend on the cost of medication, animal health care services and extra-

nutritious diets (concentrate feed and fodder including the vitamins and minerals) to regain the norms and to revigourize the animal potentials.

Floods are the outcomes of heavy torrential rains in the up-hills and lower hilly valleys. The country experienced thrice such floods in the past two decades. The first one was 1993 flood, the second worst hit was in 2001 and the third such floods in 2003 and 2010. Both Rawalpindi-Islamabad twin cities were the first affectees. Losses of humans and animals including commodities and damage to properties.

The flood waters when flow down streams, hundreds of villages on both the sides of Indus River and other small rivers in pouring nullahs are also flooded. Floods not only contaminate the low wells but also spread mud and other non irrigation water on the standing crops and fodder. Emergencies are declared in districts. Tehsils, union councils and villages adjoining rivers in Punjab and Sindh while parts of Khyber P.K, AJK & Balochistan were also affected in 1993, 2003 and 2010 floods.

Many poultry farms and dairy farms were demolished while live animals were taken away with the strong water waves. No fodder availability for 3-4 days both human life and livestock were disturbed and were badly affected with stress.

In one of such occasion in 1993, immediate arrangements were made within a months time to procure medicines, vaccines and tonics to the livestock and were air lifted from Islamabad to Northern Areas (Gilgit), Lahore, Peshawar, Quetta and Karachi to help assist the livestock and dairy Develop Departments of the then NWFP, Punjab, Balochistan and Sindh, under a TCP project No.TCP/PAK/FAO-E "Emergency Provision of Veterinary Medicines and Vaccines to the flood affected livestock farmers of Pakistan" [17]. Special teams were prepared, army personnal were called to safer place assist the poor livestock farmers some of he animals could not be taken to, as these were tied-up with ropes and the water level rose up within minutes and hours despite sirons were beagled, announcements were made in the mosques, overloud speakers but few thousand animals could not be saved out of 2-3 million population of cattle and buffaloes, in the routine flood-hit areas of the country.

Both the large ruminants (cattle and buffaloes) and small ruminants (sheep and goats) have been observed in state of stress in the wake of flood. The narrated points clearly indicate the victim animals in stress as (i) the environment is totally changed than normal and this abnormality is a real cause of stress. (ii) the fresh air is saturated with humidity and intake of oxygen is low in quantity which affects the normal metabolism, adversely (iii) since the flow of oxygen required by the animal is lowering, the vitality is lowering.

(iv) when there is lowering of vitality, supported with no intake of feed and fodder as in floods, if the situation prevails, not for hours out for days, the animals become weaker and weaker (v) the milk production is quickly reduced to totally nil production (vi) the animal shows little growing trend in body wt. rather the body wt. decreases with every passing day, in this state (vii) the young stock (both calves of cattle and buffaloes and lambs/kinds from sheep/goats) are affected. The most, hence the mortality rate is higher in young stock than in adults, in the wake of floods (viii) in the situation of floods, there is no drinking water as all the streams wells and ponds are filled with muddy water.

(ix) the animal does not like to drink from the flood water, but after a few days when the water becomes a bit normal, (due to sedimentation). The animal may drink, as being thirsty for many hours/days (x) the animals are in stress because these have to stand in water, sometimes it is knee-deep water and/or sometimes the animals is within the water except head (xi) some times the animals are drowned, specially cows as these are unable to swim as compared to buffaloes (xii) an animal taken out of flood is in a miserable stress and needs help like any thing.

Emergency assistance to victim animals of floods include (i) these victims need immediate drinking water (ii) these need nourishment for restoration of their energies (fresh leafy vegetables and fodder with molasses), (iii) these need body massage as these are in the state of rheumatism, (iv) these need immediate vitamins and tonics as their body conditions is very weak, (v) within a day or two, after their digestive system is restored to normal, with provision of feed and fodder, these may be vaccinated against endemic diseases, (vi) proper animal health care services be provided to such animals so that these can gain their health status to

normal, (vii) after complete restoration of the health status of the animal, one an expect milk production slowly and steadily.

Bedding. An animal can be under stress when the animal is brought to an un-comfortable bedding. While discussing this aspect, causing stress to domestic animals especially milch cows and buffaloes. The young stock is affected the most. Same is the case with sheep and goats. The adults are affected to a lesser extent while young lambs and kids are worst affected.

The kind of bedding which cause stress to the animals can be (i) hard concrete bedding, (ii) soaked or wet bedding, (iii) muddy or extra soft slippery bedding, (iv) bedding filled with water or dumped with urine (v) sloppy or un-even bedding.

While not going into the details of each kind of bedding exerting deteriorating physical and environmental affect on the normal living of the animal, we can judge that a single or a group of animals are in stress due to uncomfortable bedding? We will examine the condition of an animal which other wise will look apparently healthy but unhappy, distressed in the first look, in-active and rheumatic in physique and gait.

The animal must show sometimes bruises and lacerated wounds (due to fallen down frequently) on slope, un-even and slippery bedding. The animals have been seen quite of tenth a rise in body temperature, due to wet and muddy bedding with additional symptoms wt. rheumatism. In such conditions it as also been observed that the milch animals is retarded showing trend body of also does not increase.

It has also been observed quiet, rise in body temperature and such animals show foot rot, fungal infection and sloughing of hooves and soars etc. Most of the times when bedding was made comfortable, the animals started improving and such information has been documented by Saeed and Massy (2008) for farmers, in Urdu, under the caption of "animals and stress" under the SLSP project of MINFAL GoP (2003-2009) and this information booklet has also been distributed to farmers which has received every appreciation [18] available in the SLSP office, inside NARC-Gate-2 Park Road, Islamabad.

NB: The authors are high thankful to take material from that booklet (published in Urdu) appreciating their effort, in SLSP project.

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BOOK REVIEW: BASIC LIVESTOCK MANAGEMENT (CODE-253 MATRIC, AIOU BOOK SERIES) 2013

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ABSTRACT

The book under review is a new effort comprising six units (1-6) spread over 172 pages, prepared for Matric students of AIOU, written by Muhammad Hafeez and Chamman Lal, referred to the Principal Author for critical review and frank opinion with recommendations. This small course book envisions to provide information to Matric level students, in the Distant Learning System of AIOU. The book pertain to the importance of Livestock and their Management, various breeds of domestic animals, housing requirements, balanced feed, care and management and Livestock Diseases in Units 01, 02, 03, 04, 05 and 06 respectively. The detailed review has been carried out unit wise. The paper end with frank opinion and recommendations.

Key words: Basic Livestock Management Course Book, URDU, AIOU, Pakistan.

INTRODUCTION:

In the light of Committee of Courses, Department of Agriculture Sciences (DAS) of Allama Iqbal Open University (AIOU) Islamabad, and as per demands of farmers/parents to start basic courses in Livestock Management at Matric level, the Editorial Board (PJLSc) in their 9th meeting decided to carried out critical but academic review of recent books of Livestock Sector. The status of the book is Half Credit (HC), presented in a simple technical way of writing as per AIOU format. In the recent meeting referred to above to which the author is a member, there was a consensus that the recent books (in English or Urdu) must be subjected to critical and academic review alongwith frank opinion with recommendations be submitted for publication in the next volume of Pak.JLSc, being published by the Livestock Development Foundation (LDF) Regd. Islamabad.

Before a detailed review is taken up, unit wise, it is for the information of the readers/subscribers of Pak.JLSc since 2009 (when first volume, No.1 was brought out), that since we remain involved in text books of various subjects of courses of Doctor of Veterinary Medicines (DVM) or Graduates in Animal Sciences (BSc.A.H) and Masters of Science (Hons)/M.Phil in any specialty of Veterinary Sciences and/or our Ph.D study course works where all text books are in English, may be

US oriented, UK oriented Australian and/or from other countries, very less attention has been paid to Matric level students who also need to have understanding and/or show interest in Livestock Management, specially those from farmers families. This effort in Urdu is a real approach to help students of Matric level and farmers.

Similarly text books for para-Veterinary Students namely Veterinary Assistants (VAs), Artificial Insemination Technicians (A.I. Techs:) are years old and no course book in Livestock Management (LM) was offered from any Board of Intermediate and Secondary Education (BISE) and never taught in Secondary or Higher Secondary Schools, to develop basic concept for and option of choice of selecting Graduation in the field of DVM or BSc.(AH). A recent effort has been made by Muhammad Hafeez in 2012 (i) in introducing a Training Manual for A.I. Technicians in Artificial Insemination and is being used by various Training Institutions in the country.

Course books developed earlier, for FA students in Agriculture, and Livestock by AIOU have been providing information and awareness to thousands of students as reported by the Paper Evaluation Group of Agriculture & Livestock of AIOU [2] and not only the students but many thousand farmers are being benefited from the course book code-313, Dairy Farming, most of the chapters/units of which have been made ON-LINE, through Computer Programs by the Communication Information and Development (CID) of AIOU. The book Dairy Farming has now been up-dated in 2013-14 by the Principal Author of the Book, Muhammad Hafeez [3] comprising recent material. Such efforts are receiving appreciations. The book in hand is also supported with recent data and Research based information, needed as an asset [5] [5] [6].

CHAPTER-WISE/UNIT-WISE REVIEW:

The first unit/chapter one, spread over 14 pages (12-23) deals with the importance of Livestock, their role in National Economy and small holders dairy farming, the benefits from Livestock and their products namely milk, meat (mutton and beef) hides and skins, bones and bone products, wool and hair of sheep-goats and camel etc. In the same unit productive system have been discussed as to how livestock production takes place in big towns, urban and rural areas including

sheep and goats with particular emphasis on Livestock Management. Some aspects of Nomadic farming have also been written for the information of students.

The second unit/chapter two, deals with the famous Breeds of Cattle, Buffaloes Sheep and Goats of the country, spread over 38 pages (31-68) supported with colour plates of individual male and female of each breed. In buffaloes Nili Ravi of Punjab, Kundhi of Sindh and Aza Kheli/Azi Kheli from Khyber Pakhtun Khwa have been discussed for visual confirmation. In cattle, starting with milch cows namely Red Sindhi and Sahiwal while the exotic Holestein Friezian followed by cross bred have been discussed. Each breed is famous for it characteristics which have been specifically mentioned namely body structure, body colour/colour of skin, ,milk production etc etc. the Low milk producer cattle namely Dhanni, Rojhan and Dajal Breeds while heavy breeds like Bhagnari, and Lohani while dual purpose breeds such as Tharparkar and Kankerij and other breeds have been included.

Still in the same chapter/unit one, sheep and goat breeds have been included with colour photographs to differentiate one breed from the other, on at least visual conformation. This unit is also supported with references, at the end of the book [7] [8] [9] [10]. Like other units and as per the AIOU format, this unit is also supported with Self Assessment Questions and correct answers to self evaluate a student/reader as to what he/she has grasped/digested and to test his/her memory for the preparation of examinations.

The third unit/chapter 03, pertain to the housing requirements of the farm animals. Spread over 20 pages (71-90), provides technical information about what animal housing means (the selection of site, the direction of sheds, water and feed arrangements, including light and other necessities of the animals). This unit separately describes the milch cows and buffaloes housing/sheds and other infrastructure, gawala houses, store rooms for fodder and hays, the milking parlor, rest area, office for management and pits for disposal of Farm Yard Manure (FYM). Such requirements for sheep and goats have also been discussed.

The fourth unit/chapter 04, provides information on the balanced feed management for farm animals. Spread over 25 pages (94-118), this important chapter emphasizes the importance of a balanced feed for domestic animals.

The important ingredients, required in the feed for farm animals, namely Carbohydrates, Proteins, Fats, Salts, Minerals, Vitamins and Water have been so discussed in a simple but technical way that younger students of Matric level should understand easily. Different kinds of feed/fodders, hays, silages, concentrates/wandas and tonics have also been described with feed formulation of mixtures including feed requirements of different categories of farm animals. As usual the unit is followed, lastly, by self assessment questions and correct answers. This unit/chapter is also supported with references, at the end of this book [9] [11] [12] [13].

The fifth unit/chapter 05, has been written exclusively on the Care and Management of Farm animals. Spread over 25 pages (120-145), this unit describes care and management of various categories of farm animals. In cattle and buffaloe's dairy farm, care of young calves, milch animals, pregnant and dry animals are detailed while milking twice a day of cows and buffaloes along-with drying animals (in the last stages of pregnancy) and observation of cleanliness and Hygienic conditions to prevail at the farm, have been stressed.

This unit also describes various categories of sheep and goats for providing them protein rich diets for increased production, care and management by the farm authorities and animal health care. These include care of new born kinds, adult sheep/goats and as an addition, inclusion of preparation of meat animals for sacrificial purposes, in the wake of Eid-ul-Azha. These animals must be Dondas (two teeth) and Chaugas (four teeth) in male and female cattle and buffaloes while rams and bucks be at least one year to one and half years age. Both the categories have been advised to be subjected to good finishing. The unit ends with self assessment questions and correct answer for self evaluation of students and preparation of examinations.

The Last Unit-6/Chapter Six deals with various diseases of farm animals. Spread over 21 pages (147-168), provides basic information about few of the endemic diseases (both infectious and clinical/non-infectious). This chapter is actually for the diverting the attention of students/readers towards animal health aspect which remains always neglected. Problems, when faced by farmers/students, will be an economic loss to the farmers, as some of the diseases when not attended properly

and in time, the precious animal may die. These diseases are classified for the sake of easily grasping the subject in (i) Bacterial (ii) Viral and (iii) Parasitic in Nature. The diseases of bacterial origin include Hemorrhagic Septicemia (HS), Black Quarter (BQ) Tetanus, Anthrax, Bacillary White Diarrhea (BWD) and Mastitis. The viral diseases are Foot and Mouth Disease (FMD), Rinderpest, Three Days Sickness (TDS) while the diseases of parasitic origin included are Tick Fever, Coccidiosis, Liver Flukes and Lung Worms. Each disease has been explained with Symptoms, Diagnosis and Treatment while prophylective vaccination for protection of farm animals against most of the endemic diseases have also been taken up.

The clinical/non-infections diseases or ailments detailed in the book include Bronchitis, Pneumonia, Impaction of Rumen, Indigestion and Tympany along-with Milk Fever. The unit ends with the control and eradication of the diseases mentioned above and the author stresses to follow strictly the Animal Health Care Schedule (of 12 points), essentially implemented at the farm. The unit ends, as per format of AIOU and many books, the Self Assessment Questions with correct answers. The author has given the references at the end of the book.

FRANK OPINION

- This is a summarized and concise approach of providing information at a basic level for Matric students of AIOU.
- The author has taken the references to the end of the book as these may become difficult for the students at this level.
- The colour photographs of various breeds however will create interest in differentiating one breed from the other.
- Livestock Training Institutes of the country, involved in farmers training, must use this book for their trainees, with due permission from the AIOU authorities.
- Both the authors, Chaman Lal and Muhammad Hafeez along-with the reviewer of the book, M.Fatah Ullah Khan need every appreciation for this effort.

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A CONCISE AND CRITICAL REVIEW OF TEACHER'S TRAINING MANUAL VOL-II (TTM-II) – 2013

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ABSTRACT

This paper describes the salient features of Teachers Training Manual Volume-II (TTM-II), spread over eleven chapters (01-11) and 136 pages (01-136). The material resembling extracts from B.Ed. and M.Ed (Teacher Education) of various Universities, briefly summarized to fulfill the requirements of one month's training program. This manual revolves around "the Inside" of a school dealing with importance of such trainings in organizing teaching institutions (The Schools) in chapter 01, while the characteristics and role of teachers has been inscribed in chapter-02. Chapter 03 has been written putting light on the responsibilities of a teacher and discipline within the school while chapter-4 pertain to student evaluation (examinations, vigilance and results). An exclusive material deals with the pre-requests of a school in chapter-5, namely school building, staff (both teaching and support staff), syllabi, teaching equipments, a science laboratory and a library. The references have been included in the Bibliography at the end of the book. Chapter-06 deals with the basic but important aspect of record keeping while chapter-07 describes the inspection of schools. Chapter-08 highlights the academic activities within a school while a new responsibility of teachers has been included. A pre-feasibility for establishing any school, a specific endeavor has been made for teachers in chapter-09. Lastly the preparation of a project proposal (PC-I) for establishing a school (Primary, Elementary/Middle, Secondary and/or Higher Secondary level) in private or Govt. Sector has been attempted in chapter 10 of this TTM-II followed by the introductory monogram/brief of any school namely the prospectus, has been included in chapter-11. This TTM will enable a teacher to run the school affairs in a better way, in the light of National Education Policy 2009-10.

Key words: Teachers Trainings Books/Manuals, Education, Pakistan.

INTRODUCTION:

This review paper, based on the Teacher Training Manual Volume-II (TTM-Vol-II) written by Muhammad Hafeez and his co-authors, the text of which was formally reviewed by the reviewer Prof. Khizar Hayat, was entrusted by the Editorial Board of the Pak. Journal of Livestock Sciences (PJLSC) under a decision to review recent books and manuals with frank and crital deliberations for the reader(s) of PJLSc. The Teachers Training Manual splitted in Volume-I and II was a commitment in a Project proposal of an NGO Nari Welfare Association (NWA) of Tando Alllahyar Sindh [13], for supporting their teachers with academic material and providing training to 300 untrained teachers per year in batches of 50 candidates each, and over a period of 03 years [15] providing training to 900 untrained teachers requirements of course book.

This Training Manual will also complete the requirements of course book of Educational Training Institutes of Peshawar Lahore, Quetta, Muzaffarabad, Gilgit/Baltistan and Sakrand, Benazirabad, Sindh including the curriculum wing of Ministry of Education, Government of Pakistan, Islamabad, for Federal Training Institutes [28].

This will also help assist the Private sector educational system for providing trainings to their in-service teachers to run the school affairs in a better way [29].

This is the first of its kind, recently written educational academic material, Registered in the National Library of Pakistan with ISBN-978-969-9219-09-5, in the year 2013 will become an asset for all those School Teachers who will get this book in their training programs, as per educational policy (2009-10) and as pointed out in the Annual Survey of Educational Report (ASER) (2011-12) [30] [31].

CRITICAL AND FRANK REVIEW:

The following is chapter wise, critical, frank but deliberated review of this book, envisioned by us, with the proposed option that when this review article goes to any referee, the TTM-Vol-II must also be accompanied:-

The TTM-Vol-II revolves within the theme of Primary Elementary/Middle, Secondary and Higher Secondary Schools as an Organization, (the Building, the Infrastructure, the Furniture and Equipment, the Academic and Support staff) the academic and administrative aspects, as will be seen in each chapter's summarized write ups.

Chapter-01 spread over nine pages (01-09), describes the importance of training in organizing a teaching institution, the school. This introductory chapter provides the background and actual requirement as to how this TTM-Vol-II will help a teacher to run the school affairs in a better way deliberated in (i) to (x) points. A simple difference of a short training for teachers and degree training program such as B.Ed., M.Ed. and Higher qualification has been elaborated, as understood at home and abroad, in the light of various university's programs [18]. An exclusive approach has been given for the appointments of teachers with subject specialization, as an attraction to any subject for a teacher [9]. A short note on

various kinds of trainings has been included in ten lines while an observation of improvement with such trainings as seen by the author and also going through various inspection reports of both Govt. As well as private sector school, jotted down in 18 lines which can be grasped by any teacher who undergoes such training(s) [10].

Chapter-2, spread over eleven pages (10-21), deals with the pivotal role, responsibilities, coordination, Govt. Set-up in a school, the training of trainers (TOT) while some of the responsibilities of the teachers beyond the school have also been discussed. This chapter revolves within the theme of a teacher, the education and any school. Sometimes he/she is a Head Teacher/Principal, A Vice Principal, a class teacher and/or a subject teacher. Each position has been described with individual responsibilities and how a teacher has to shoulder his/her responsibilities in teaching and coordinating simultaneously with students affairs and the Administration [31]. Post-wise/position wise Govt. Setup with Basic Pay Scales (BPS) with special allowance for additional duties. A mature sense to trainees has been given to the effect that "Yesterday's students are todays teachers" and practically experienced in a narrative form.

Some National level additional responsibilities of school teachers like involvement in preparation of voters lists, election duties, population census and many surveys as requested by federal as well as provincial Governments, from time to time which will enable the trainees to mentally get prepared for such kind of duty [33].

Chapter-3, spread over nine pages (23-31) has been written on the characteristic and subject teaching. Some of the duties of academic nature, keeping the balance within teaching and discipline, with some additional responsibilities (within the school) such as admission, Second, Head and Vice Principal, supervising other extracurricular activities (conduct of examinations, debates and sports etc). An important aspect of streamlining the school academic schedules, the syllabi and the actual implementation of trainings in the improvement of the school system has also been discussed [7].

Chapter-04, spread over 10 pages (33-44), is limited to student's evaluation such as the conducting of examination, the vigilance, secrecy and preparation of results and certificates. This chapter as usual, the author starts, with the importance,

describing the paper setting and its format, instructions to the candidates (students), the supervision work, the practical work in the laboratories, the oral examination (viva voce) and compilation of results for declaring and lastly the preparation of certificates to be awarded to each student, of any class, as many institutions do it [11].

Chapter-05, spread over ten pages (46-57), is in particular the information of all pre-requisites for the establishing of any school. This includes piece of land and he school building, the academic and support staff and the academic material to be used in the school for teaching (the syllabus the books in both Urdu and English medium in accordance with the system of education in any school. This chapter also provides information of school furniture, the equipment (specially the audio visual aids, the computers) a science laboratory (equipment and chemicals) as well as the school library [18]. Some of the additional requirements of school like cafeteria, the school stationary shop, the recreational activities, indoor games, the school mosque with basic needs of drinking water and wash rooms etc. have been mentioned [26] [27].

Chapter 06 spread over nine pages (61-67), deals with the record keeping of a school. Which comprises administrative, academic and financial aspects. Computer use of securing each and every information/ data, pertaining to students enrolled, new admissions, school leaving, results both school and board examinations including teachers academic, administrative, salaries, fee deposited, students individual record, role of honour, and all other particulars of the school based on which the progress reports (monthly, six monthly and annual) are prepared [8] [9] [17] [19].

This chapter also includes some important items worth inspection namely the teachers work book, the school yearly academic calendar, the time table and attendance (daily, weekly, fortnightly, monthly, six monthly and yearly) of both student's and teacher's. Some additional duties, to be entrusted to teachers have been discussed [8] [9].

Chapter-07, spread over 12 pages (71-83), is an effort made by the author on "the inspection" of a school. Referring to various inspection reports, improvements have thus been observed and deficiencies noted by the inspection team visiting a

when school were addressed by the administration, in the coming year and with the availability of resources, most of the difficulties were overcome. Some of the documents worth inspection have been enumerated such as (i) academic (Teacher's work book, student's results, transcripts/Detailed Marks Certificates (DMC) teachers Curriculum Vitae (CVs), the syllabi, the practical note books and previous Annual Reports, (ii) Financial, cash book, bill book/Register, School ledger of Finance fee etc., TA bills of teaches, salaries register and utility bills (paid) records while in the (iii) Administrative record all enrolments, teacher's arrivals and departures, supporting staff joining(s) and departures with all merits displayed along-with role of honors etc. [10].

Chapter-8, spread over twelve pages (84-95) describes academic activities of the school schedule (weekly, monthly, six monthly and yearly) within a disciplined time table and the school academic calendar. The activities beyond the daily school time table i.e. 7:30, 8:00 a.m. to 1:00, 2:00 p.m., the school administration and the academic staff working for the important work "behind the scenes" In various meetings, all streamlining work is carried out. The academic calendar is season wise split into vacations, sports weeks, National Days celebrations (14th of August, 23rd of March, Eid-e-Millad-un-Nabi (SAW), Muharam Ashoora, Iqbal day Defence of Pakistan Day (6th of September), world food day (16th of October) the May Day and world Literacy Day including Teacher's Mother's Days and X-Mas for Cristian students and Eid Milan Parties, after Ramadan, and the Eid-ul-Azha etc. etc.

The examinations (both Midyear and Annual), together with assignments, Quizes and preparation for board examinations are some of the important activities in any academic calendar of an year, in any school [6][8].

Chapter-9 spread over ten pages (96-105), bring to the trainees an area linked with education and studies, the Research and Development (R&D). Although not a new approach, the untrained teachers are apprised with the write-up of 9-10 pages, the basic information as to how survey studies are completed what is Technical Report writing and those teachers who are planning to go for B.Ed, M.A (Teacher's Education), M.Ed., MEP and/or M.Phil or Ph.D. studies, must become aware of R&D and its role in the educational system at home and abroad. With the written material in this chapter, one can easily develop his/her mind that all

development is research based. The graduate students must also be aware of synopsis and thesis writing in future. Some areas have also been indicated.

Chapter-10 is a real effort made by the author, spread over 19 pages (106-124), encompasses the feasibility based project proposal (PC-I) for establishing a school of Primary, Elementary/Middle, Secondary and/or Higher Secondary level. As the Banks and Financial Institutes Assist Academic Institutions with potentials of growth, specially those with credibility (proper accounting system, the Annual Reports, together with Annual Audit Reports supported with Bank Statements). Some of the Private sector school systems are flourishing with the financial assistance of credits for addition, alteration, up-scaling and developing new computer based education. An example of a feasibility of an NGO is also annexed with this chapter. This is again an asset for trainee teachers, may be, they may better use it, in future.

Last but not the least; the school prospectus has been included in this TTM-Vol-II, chaper-11, spread over 12 pages (125-136), the author has concisely drafted the outlines of a prospectus (for any school) with brief introduction of the school/history as preamble, credibility, the existing facilities, the academic staff (teachers) with their qualifications, the school system (Urdu or English medium), equipments, teaching aids, science laboratory and/or a Library facilities including school finances (admission fee, tuition fee, paper money, sports funds etc. etc.). The school uniform, the school honors results and any achievements etc. must be highlighted. At the end of this proposed prospectus, the admission form of the school is shown.

CONCLUSIONS AND RECOMMENDATIONS:

(i) The author has prepared a concise and brief presentation of organizing a school in a better way.

(ii) Most of the material resembles the Urdu write up of Code-513 B.Ed. of AIOU but nicely presented.

(iii) Although this TTM-Vol-II is a second part of one month's program for untrained teachers, will be most useful book comprizing of 11 lectures.

(iv) This will make the way easier to make up the minds of education minded teachers to get at least a B.Ed and/or M.A. (Education) and remained involved in the sacred profession of teaching.

(V) No such effort has ever been made in the field of education specially the Primary, Elementary/Middle, the Secondary or Higher Secondary school level.

RECOMMENDATIONS:

(a) This TTM Vol-II must be included in the teachers trainings, at all the Federal, Academy of Education Planning and Management (AEPAM) and Provincial Teacher's Training Institutes in Punjab, Sindh, Balochistan, Khyber P.K. Gilgit/Baltistan and AJK including FATA.

(b) This should also be included in the NRSP's IRM. Training Programs for teachers as well as Training of Trainers (ToT) for Principals/Head teachers, and inspectors of schools.

(c) This must also be included in the private school systems of repute to help all teachers in primary, Elementary/Middle and/or Secondary as well as Higher Secondary levels.

(d) The Federal Ministry of Education's Curriculum Wing must provide such a recent Manual to all Federal Schools, for ready reference.

(e) Provincial Education Ministries should also provide this book to each school for ready reference as an asset.

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LIVESTOCK BIO-TECHNOLOGY: A FUTURISTIC TOOL AND ITS USE IN LIVESTOCK PRODUCTION, BREED IMPROVEMENT AND ANIMAL HEALTH

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ABSTRACT

This academic cum research article describes the broader scope of uses of biotechnology in Livestock production including breed improvement and animal health. Some preliminary work done on DNA fasting of 102 bulls (males) of Kundi Breed (from calf hood) along-with few Bull Mothers (BMs) for identification in vitro processing of 102 blood samples collected from buffalo male calves (kept at the farmer's sheds in Tando Allahyar) for future use in breed improvement programs. The DNA test assays included proper labeling (Diaper Tagging) of Elite (03) A+ (03), A(25), B(27), B+(16) and C(28) categories of calves of bull mothers with 17-20 liters per day (Elite) with 15-16 liters per day (A), with BM's milk of 13-14 liters (B), with BM's milk of 11-12 liters production (B) and (C) with 8-9 liters of milk per day. The Laboratory work of DNA testing at the Institute of Biochemistry and Bio-technology (IBBt), UVAS, Lahore, comprised DNA extraction, quantification, cryo-preservation, and Specific Primer Designing (in first six months). The second phase (of six months) comprised Primer Synthesis for Mito-Condrial D loop forming and Cyto-chrome-B, gene (the Primers and cyto-chrome–B gene were imported from USA for this analysis) for breed conformation. The third six monthly Lab. work comprised primer designing of Micro-satellite markers, from bovine gene synthesis. Further work of gene testing through RFLP, squeezing and final evaluation through bio-informatics tools, with the ranking of animals, was pending for want of funds. The Lab. work was performed under LDF-PARC Project funded through ALP grant Assistance of Project No.AS-137 "Production of Genetically Superior Bulls of Kundi Breed of Buffaloes in Sindh (Phase-I), during the period 2010-2011. No much financial expenditure was involved except Rs.0.57 millions (Rupees five lacs and seventy thousands only) for one and half year, as operational funds for only 3rd phases of on this work. Sustainable efforts have been suggested for the researchers, planners and farmers to explore scientific breed improvement program in the country. The DNA tested kundi buffalo bulls have shown an average cost of Rs.1,50,000/- to Rs.1,60,000/- in the year 2012 December, which is now increasing. This cost before testing (before our project, in 2009-10 was Rs.70,000/- to Rs.75,000/- each.

Key words: Livestock Biotechnology DNA Breed Improvement Kundi Buffaloes Sindh, Pakistan.

INTRODUCTION:

Biotechnology (its importance, use and future utilization) in the fields of agriculture, human beings, wild life and Livestock is the subject of present and coming half a century and beyond. In Pakistan, its practical use started in seventees, is continuing as the Scientists of AECP, NIAB, NIBJE and from NIGAB, various Universities of the country namely UAAR, NUST, UAF, KOHAT University of Biotechnology, CEMB-Lahore and Since 2007 IBBt-UVAS, Lahore are involved (Masroor Elahi Baber-2010) [1].

The International importance of biotechnology (in animal cells human cells, forensics, biologics and vaccines, human and veterinary medicines, the diagnostics and DNA related wet-lab. tools (primers, enzymes, hormones PCR

technology molecular diagnostics and Lab. equipments are now being prepared and sale/purchased, for use (Masroor Ellahi Babar-2011) [2]. The biotechnological tools equipments and laboratory procedures (protocols) although the costly issues, need an academic support of bio-informatics, as being used by the students, teachers, lab. diagnosticians and technicians towards agent based modeling of individual and social behavior of organism, molecules and animals at home and abroad (Muaz Niazi and Amir Hussain – 2010 [6].

The institute of Biochemistry and Biotechnology (IBBt) at UVAS Lahore conducted three mega events in 2010 namely (i) National conference on bioinformatics (May-2010) (ii) National Biotechnology Exhibition and Seminar at Lahore (20-21 October, 2010) and (iii) National conference on Animal Forensics DNA Finger Printing (21-22 September, 2010) entitled "National Workshop on Molecular Diagnostic, January (2011) at UVAS, Lahore. The proceedings of which include the presentations of National and International Scientists. All the events sponsored by HEC, Islamabad.

A total of 27 institutions are dwelling with the biotechnological lab. work mainly on Agriculture, human beings, but very little work on animal biotechnology is being undertaken in DNA involving assays towards dairy breed improvements. These institutions are in Faisalabad (04), Rawalpindi-Islamabad (05), Jamshoro (01), Karachi (06), Lahore (06), Multan (01), Peshawar (03) and Quetta (01).

When the three mega events of biotechnology of May-September and October, 2010 (Animal Forensics DNA finger printing and National Biotechnology exhibition and seminar in October, 2010) were organized. The project entitled "Production of Genetically Superior Bulls of Kundi Buffaloes in Tando Allahyar Sindh" Project No.AS-137 (LDF-PARC approved project) was already started. This project was earlier submitted by the executing NGO, Livestock Development Foundation (LDF), Islamabad, placed before the apex bodies of PARC, duly subjected to referees evaluation in 2009-2010 and approved under ALP program. The project started in January-2010 was initially approved for a period of three years (2010-12) and No funding released after July-2011. Any how much progress was achieved in one and half years, where 102 male calves were identified, taken from bull mothers of Elite, A+, A, B+ and B categories (while C category were rejected).

Blood samples were collected from these male calves and brought to IBBt, UVAS-Lahore, for DNA tagging/identification and further processing as detailed in the methodology, in next paragraphs. As understood these calves were subjected to three rejections in the years 2010 based on unwanted phenotypic characteristics (mainly appearance of white hair on the skin). Only 94 male calve grew to become nature bulls in 2013.

MATERIAL AND METHODS:

(i) 102 blood samples were collected in vaccutainers (with anticoagulant).

(ii) All the chemicals required at IBBt, UVAS were provided and the work was splitted into three phases.

a. Phase-I (July-December-2010), b. Phase-II (January-June-2011) and Phase-III (July-December-2011). The DNA test assays were done at IBBt UVAS, Lahore.

(iii) Phase-I comprised DNA extraction, quantification, proper labeling cryo-preservation and specific Primer Designing (Diaper Tagging).

(iv) Phase-II work involved primer synthesis, Mitochondrial–D Loop, and Cytocrome-B gene (from USA) for breed confirmation.

(v) Phase-III work involved the primer designing of Micro Satellite markers from bovine genome synthesis and optimization including genotyping of micro satellite.

(vi) Phase-IV (incomplete agenda of our objectives which could not be carried out due to stoppage of the project and for want of funds:

- Genetic testing through RFLP and sequencing
- Final evaluation by bio-informatics tools.
- Ranking of the animals.

(vii) Body growth data was collected fortnightly from May-2010 through December-2012 and has been summarized separately.

(viii) Animal Health Care in terms of 100% vaccination with HSV, BQV, ASV and FMDV was done along-with de-worming twice a year and spray of acaricides twice a year.

(ix) One MSc. Student was involved from SAU Tandojam for collecting data on body growth studies, on fortnightly basis.

(x) One PhD. Student was involved at IBBt, UVAS for genomic studies.

RESULTS:

i. All the blood samples collected form male calves of kundi buffaloes (from 83 registered farmers, of Tando Allahyar) reached IBBt-UVAS, Lahore.

ii. All the chemicals and bio-reagents were provided to the Lab. staff of IBBt-Lahore.

iii. The Phase-I work of DNA extraction quantification, proper identification labeling (Diaper Tagging) was done including Cryo-presentation (in six months target).

iv. The Phase-II work of Primer designing was also done while primer synthesis and other related work was completed (in six months).

v. Mitocondrial-D loop work was also completed. The Cytochrome-B gene was imported from USA and used successfully.

vi. The Phase-III task of breed conformation was done and dentogram displayed on the software, using bioinformatics.

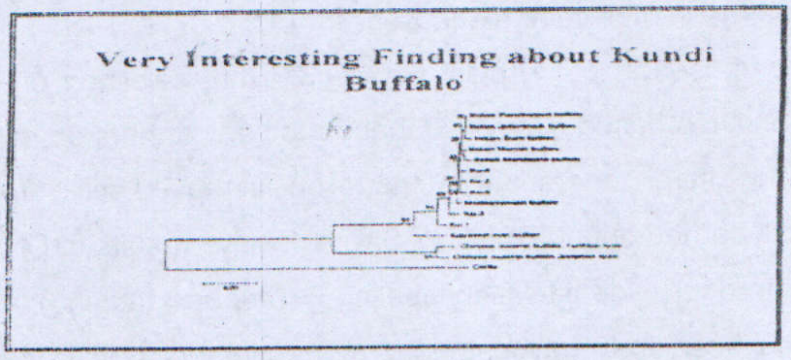
Table No.1 showing the DNA diaper tagging at IBBt. UVAS Lahore (of male calves of kundi Buffaloes) LDF PARC Project No.AS-137-2011.

Sr.#	Category	Number	DNA-Diaper Tagged (I.D)
01	Elite	03	K732-K734
02	A+	23	K735-K758
03	A	25	K759-K783
04	B+	27	K784-K810
05	B	16	K811-K826
06	C	8-14	K827-K-840

NB: The C category being from bull mothers with less than 08-09 liters of milk were not processed further.

The Dendogram obtained thorough Bio-informatics is reproduced as under:-

Figure No.1 showing Dendogram of Kundi Buffaloes as compared and confirmed with the Tando Allahyar male calves.



Source: IBBt, UVAS, Lahore and LDF project report.

vii. Phase-IV work pertaining to Genetic Testing through RFLP and sequencing, final evaluation using bio-informatics tools and ranking of animals could not be completed due to stoppage of the project and not releasing the funds by PARC, for reasons unknown. Salient achievements however are available in the final completion report of LDF-PARC Project No.AS-137.

DISCUSSION:

The project was cast on sound footing, duly referenced and the pioneer work of production of genetically superior bulls of kundi buffaloes on which further work can be continued (was running smoothly but this work was stopped due to want of funds). Biotechnology is successfully being utilized as envisioned in Agriculture [7], Biotech. Products [8], human health [9][10], industrial waste management and environmental issues [11] clinical applications in Laboratory [12][13] and Molecular Diagnostic business in Pakistan [14]. Molecular Diagnostics are important for students, researchers and diagnosticians [15]. The Molecular Diagnostic individually stressed for infectious agents [15] in HCV and HBV Laboratory tests [17] [25], the uses of High Resolution Meeting Analysis [18], the use of nano-technology in molecular diagnostics [19] including pre-natal Diagnosis of various tests in human being and animals [20], specially in pets [21]. Some young researchers have narrated the quality control in Molecular diagnostic [22] while some workers have described the application of cytogenetics and Molecular cytogenetics in diagnostics [23]. Some workers have expressed concern in various hurdles encountered in molecular diagnostics [16].

What we had proposed in our Project No.AS-137 that selection of kundi buffalo bulls be made on DNA based assays so that prototype mothers on milk production be identified and future generation be made on increased milk producers. The three phase work carried out at IBBt, UVAS with positive results of DNA extraction, quantification, proper identification/labeling (Diaper tagging) with Cryo-preservation has been truly advocated by many workers [24] in extraction and spectrophotometer quantification of nucleic acids, Mitochandeal gene [27], Demonstration of DNA genotyping (old VS new) [32].

Some of our work remains pending regarding phase-IV of DNA tests (genetic testing through RFLP and squeezing along-with final evaluation and ranking of animals, through bio-informatics which almost majority of researchers stress at home and abroad [2] [32] [33] along-with quality control [22] stressing animal forensics and DNA finger printing [2] and PCR-RFLP analysis of cyto-chrome B gene [36] [37].

The total financial resources made available to IBBt-UVAS lab were the operational expenses amounting to Rs.0.57 millions (Rs. Five lacs and seventy thousands only) out of the total allocation of Rs.9.4 millions for three years but released only Rs.3.2 millions over one and half years. The IBBt. Lab. At UVAS, already equipped (with costly equipments, chemicals manpower and bio-informatics in place where MSc.(Hons)/M.Phil and Ph.D students are continuously working [1] [2]. The salient achievements of AS-137 project of LDF-PARC-ALP have been enumerated in the Final Report in 2012, the LDF 9th Annual Report 2012-13 and in new project proposals. (Submitted to PARC for funding, under ALP Program, if approved) in 2013-14.

RECOMMENDATIONS:

Such work must continue for breed improvement in dairy animals.

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ABBREVIATIONS:

IBBt.	Institute of Biochemistry and Biotechnology (of UVAS Lahore).
DNA	DE-Oxy Ribo Nucleic Acid
RNA	Ribo Nucleic Acid
NATs	Nucleic Acid Tests
IAEA	International Atomic Energy Authority
FAO	Food and Agriculture organization (of UN)
MRNA	Messenger RNA

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RRNA	Ribosomal RNA
FDA	Federal Drug Agency (of USA)
PCR	Polymerase Chain Reaction
K-PCR	Kinetic-PCR
TIGER	Triangulation Identification for the Genetic Evaluation of Risks
RT-PCR	Real Time PCR
AIV	Avian Influenza Virus
Q-PCR	Quantifying-PCR
RFLP	Restriction Fragments Length Polymorphism
IVD	In Vitro Diagnostics
CEMB	Centre of Excellence for Molecular Biology
SSCP	Single Stranded Conformation Polymorphism
FISH	Fluorescence In Situ Hybridization
AFP	Maternal Serum Alpha-pheto Proteins
DASH	Dynamic Allele Specific Hybridization
CGH	Comparative Genomic Hybridization
GMOs	Genetically Modified Organisms
NC-RNAs	Non Coding RNAs
Snu-RNAS	Small Nuclear RNAs
NCB	National Commission on Biotechnology
RAGNI	Radiation Genetics Institute (Faisalabad)
NCAFDF:	National Conference on Animal Forensic DNA, Finger Printing.

STREAMLINING THE MSc.(Hons)/M.Phil PROGRAM, LIVESTOCK MANAGEMENT, OF ALLAMA IQBAL OPEN UNIVERSITY, ISLAMABAD

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ABSTRACT

This research cum administrative paper describes the flaws and some observations/discrepancies pointed out by the Pakistan Veterinary Medical Council (PVMC) as well as the Accreditation Inspection Committee (AIC)'s Report in the light of National Agriculture Education Accreditation Council (NAEAC) in this program (MSc.(Hons)/M.Phil-LM). The detailed streamlining action taken by the Committee of Courses (CoC) in June-2014, followed by the Faculty Board Meeting (FBM), held in September-2014 together with the Academic Council of AIOU (October-November-2014), will now meet the HEC and PVMC requirements hence all un-towards concepts will be removed from the brains of students, the Federal Public Service Commission (FPSC) and Provincial Commission of Punjab and other provinces including Departmental Promotion Committees (DPC) of Livestock and Dairy Development Departments (LDDDs) of Provinces etc. The paper ends with the conclusions and recommendations. Such efforts never come out for students but remain the background spade work and dedicated brain storming towards decision making.

Key words: AIC NAEAC HEC, PVMC MSc.(Hons)/M.Phil LM AIOU, Islamabad.

INTRODUCTION AND BACKGROUND:

The subject of MSc.(Hons)/M.Phil Livestock Management (LM) was launched as a program way back in 2000, based on the requisitions of professional veterinary sciences BVSc, BSc, AH/DVM and Animal Sciences BSc(AS) graduates together with teachers and livestock departments of all the Provinces, AJK and Northern Areas (NAs). Private sector was also consulted. The course work and practical work was designed in accordance with the standing guideline of Distant Learning System (DLS) of Allama Iqbal Open University, (AIOU) and in line with the statutes of the University etc. This program went on smoothly in the previous years.

Courses contents and books for each subject were developed by the Committee of Courses (CoC), as a routine, on the AIOU format, duly recommended by the Faculty Board Meetings (FBM) and finally approved by the Academic Council of AIOU (ACAIOU) involving all the competent course writers, reviewers, the Academic Planning and Course Production (APCP), duly edited.

The case for Accreditation with the Pakistan Veterinary Medical Council (PVMC) [2] Islamabad was first initiated in the year 2005 [1], who examined the case and entrusted this task to two technical members of the Council. This two member

committee visited AIOU, Head Quarters, Islamabad and gave their recommendations, with major requirements of the laboratories and stress on practical work.

Thanks to the approval of Allama Iqbal Open University vision plan (AIOU-Vision-2020) [8], the Science Block of AIOU was established in the year 2006-07 for Science Departments including Agriculture and Veterinary/Animal Sciences among others(Chemistry, Biology, Physics, Mathematics and Statistics). These laboratories were supported with necessary equipments and chemicals along-with laboratory wares, as a result, practical work started.

Another Development took place for detailed practical work when a Memorandum of Understanding (MoU) was signed between the AIOU and National Agriculture Research Centre (NARC)'s Animal Sciences Institute (ASI) [3] where in scientists from related Disciplines were required to assist AIOU as external faculty as well as practical work began in ASI Laboratories. The case of Accreditation was resubmitted to PVMC [05] in the year 2012, which was linked with HEC's AIC's inspection report of the National Agriculture Education Accreditation Council (NAEAC) [07]. A two member committee inspected AIOU Department of Agricultural Sciences (DAS) and L.M. program on 31st December 2012 and January 1st 2013. The Inspection Committee's report is self explanatory and included in the report, referred to above.

In the light of AIC report of NAEAC [07] some of the courses were subjected to Amendment and streamlining bringing these at par with HEC requirement which will also support this case in the PVMC's Recognition of the degree of M.Sc(Hons)/M.Phil-LM as well as accredited in HEC.

The quick follow-up action was initiated in the DAS and the course coordinator, with his additional painstaking efforts convened the CoC with its 11 members from various Universities (PMAS-UAA-RWP, UVAS-Lahore, QAU, Islamabad, Scientists from NARC and others who met in AIOU on 10th of June, 2014. This was supported with the Higher Forum of FBM [05] [06] on 16th and 17th of September 2014 which will now be finalized by the Academic Council of AIOU surely in 2014.
It can now be said with satisfaction that this much background/homework done at DAS will satisfy the 100% requirements of PVMC, the NAEAC of HEC and all the

doubts in the minds of students as well as provincial services commission and L&DDDs of Provinces including Federal Public Service Commission (FPSC), Islamabad to the effect that this degree will get equal consideration for candidature of an incumbent for selection against relevant positions.

MATERIAL AND METHODS:

The following official record was excessively consulted:

(i) Complete agenda of CoC of MSc.(Hons)/M.Phil-LM Program.
(ii) Complete Agenda of 15th Faculty Board's Meeting.
(iii) Complete Report of NAEAC, No.64 of HEC.
(iv) Complete Report of AIC for DAS, AIOU (December-2012)
(V) Complete Reports of PVMC-2006-07 and 2011-12.

RESULTS AND OUTCOMES:

1. With the proper technical efforts, involving experts of the subject (both Veterinary and Animal Sciences), through the CoC and Faculty Board, most of the flaws and deficiencies were over-come.
2. The course work, in terms of individual subject credit hours, the thesis and practical work was brought at par with other M.Sc.(Hons)/M.Phil programs.
3. With the support of new technical feedback namely the course work, the laboratory/practical work (both at NARC, Labs. and AIOU Science Block Labs) and course books (amended and re-written), will now up-scale and authenticate the academic standing of M.Sc.(Hons)/M.Phil, LM, at par with HEC accredited Institutions in the country.
4. The summarized changes/amendments done are presented in the table below:

Table Showing the summarized changes/revision proposals in various courses of M.Sc(Hons)/M.Phil Degree Program at AIOU.

Sr.#	Course Code with title	HEC/UGC recommended	Proposed Revision
01	Rangeland Management in Pakistan, Code-2501	Unit wise addition alteration with proposed revision	Comprehensive approach proposed in various units
02	Meat Production Code-774	Advanced meat product with practicals	Advanced Meat Production New code allotted and supported with practicals

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Sr.#	Course Code with title	HEC/UGC recommended	Proposed Revision
03	Small Ruminants Production Code-773	Advanced sheep and goats products and Supported with practical's	Small ruminants production code-773. With amendments and revision. Supported with feasibilities of sheep and goat productions.
04	Dairy Production Code-778	Dairy production Supported with practical's	Dairy production Changes, revisions Mergers of various units etc. Supported with practical's
05	Livestock Management Practices Code-775	Livestock Management practices supported with practical's	Livestock management Practices. Amendments and revision in various units, updating write-up and supported with practicals
06	Livestock Industry Code-782	Livestock Industry (Theory)	Livestock Industry Code-782 Amendments in various units. Revision of parts of 2-3 units out of 09 units. Supported with feasibilities and practical work.
07	Biochemistry Code780	As in vogue	No change
08	Statistics Code-794	As in vogue	No change

DISCUSSION:

The M.Sc(Hons)/M.Phil L.M. degree program was initiated in the year 1998, as part of the AIOU Graduate Programs. Course contents of various text books, encoded 700 onwards level for course (four courses in each semester) for three semester and one last semester for thesis research work [9]. The CoC comprises representatives/subject specialists from various universities namely Agriculture University Peshawar, PMAS-UAA, RWP, QAU University, UVAS Lahore and Experts from NARC/PARC, Islamabad including private sector subject experts.

The program was running nicely when the question of Accreditation was agitated by the stake holders (mostly the current students). The principal author being directly involved in the establishing of PVMC at Islamabad. Which entity is responsible for the Accreditation of Degree awarding Institutions in the field of

Veterinary and Animal Sciences along-with the degrees awarded at home and abroad [02].

At the time of first submission of the case of Recognition/Accreditation in the year 2006 [01] when the principal author was consultant course coordinator, appointed at AIOU and a two member committee was appointed by the PVMC who inspected the AIOU campus and pointed out some deficiencies including the Laboratory requirements at the campus and increasing the faculty staff.

Thanks to the Dean Faculty of Sciences and other competent academicians devised a vision plan known as Allama Iqbal Open University Vision Plan (AIOU-VP), 2020, under which the Science Block was established in the year 2007-08 with HEC Financial Assistance [08] in which Laboratory facilities were made available for Agriculture and LM graduating students.

Yet another Development took place when an MoU was signed by AIOU with NARC of PARC for technical cooperation, using experts in Livestock Sciences as tutors and Lab. Practical work at NARC, Laboratories (2012), on the analogy of an MoU signed between PMAS UAAR and NARC in Agriculture Sciences in (2009-10).

While the AIC's report by NAEAC of HEC [7] was received by AIOU and follow-up action started. This involved course work streamlining through CoC and approval of Faculty Boards meetings [05] [06], duly supported by the Academic Council of AIOU (AC-AIOU) [10]. All the three authors of this write-up have remained actively involved in each if the CoC meetings, FB meetings and the Dean of Sciences with other dignified Academicians subject experts of this forum.

With three consecutive hectic efforts, the case, as understood, was now in final stages of accreditation which will remove all doubts about the status of M.Sc(Hons)/M.Phil LM degree program of AIOU and the students as well as the degree holders will get a sigh of relief for submitting applications for any job in the country and abroad.

RECOMMENDATIONS:

1. All degree programs initiated by Degree Awarding Institutions (DAI's) must get their programs cleared from the concerned councils e.g. programs

involving Engineering graduates must take into confidence (in writing) the Pakistan Engineering Council and Degree awarding Veterinary and Animals Sciences Institutions must get clearance from PVMC, Islamabad.

2. All graduate courses must be streamlined, (before offering), in the light of HEC's councils and bodies so constituted.
3. All the pre-requisites must be fulfilled before launching any graduate program by DAI's.

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SOCIO-ECONOMIC CHARACTERIZATION OF COMMUNITIES IN INTEGRATED WATERSHED DEVELOPMENT

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ABSTRACT

Barani areas, characterized as rain fed areas, make significant contribution to agriculture, livestock production and foreign reserves. The main focus of this study was to evaluate socio-economic characterization of communities in Integrated Watershed Development in District Chakwal. A baseline study was conducted to characterize the livelihood of communities in terms of their assets and opportunities. The survey results revealed that average age in all three villages was 56-58 years. Joint family system was predominant, with average family size of 8 members. Education dominated in Kallar Kahar as compared to Ratta Sharif and Chak Khushy. Similarly it was observed that majority of the people were poor to moderate that led to lack of credit limits of agriculture. Only few farmers had tractors but lacking all other modern farm machinery. Land holding was moderate. Rain was the main source for crops in Chak Khushy and Ratta Sharif villages whereas in Kallar Kahar 70 percent of the area near Nikka dam was irrigated; remaining uncultivated land was used as grazing area. It was also depicted that majority of communities claimed their uncultivated land could only be cultivable if government helped them in any way. Mostly the rain was received in monsoon season and irrigation practices consisted of deep boring tube wells and turbines. A study also discovered that due to non-availability of water, farmers were switching over to livestock husbandry. It was accredited that selected villages of Dharabi watershed the resource potential of land was not fully explored, which if fully used could increase production and socio-economic conditions of that rural community would improve.

Key words: Watershed development, socioeconomic characteristics, community Pakistan.

INTRODUCTION

Pakistan is an agrarian economy, heavily dependent on water from its rivers for various purposes, ranging from agriculture to power generation, of which agriculture is the single largest sector and dominant force for growth and development of national economy. It accounts for 21.4 percent of the GDP and employs 45 per cent of total work force. Almost 62.9 percent of country's population living in rural area, is directly or indirectly linked with agriculture for their livelihood. Agriculture is growing by 3.3 percent, annually and contributes to growth as a supplier of raw material to industry as well as market for industrial products. It also contributes sustainably to Pakistan's export earnings. Whatever happens, agriculture is bound to affect not only the country's growth performance but to a larger segment of the society as well (GOP-2011-12; Pak. Economic Survey-2012-13).

Pakistan is blessed with different topographic land and is one of the world's most arid countries, with an average rain fall of 240 mm a year (ICARDA, 2007). Barani

areas are characterized as rain fed areas, makes significant contribution to agriculture, livestock production and foreign reserves. Out of total cropped area of 21.5 million hectare about 5 million hectare do not have any irrigation facility and completely depends upon the rainfall (N.A.R.C, 2003) and (GOP, 2007).

In Punjab, Barani area accounts for 18.6 per cent of cropped area (ICARDA, 2007) whereas, in Potohar region cropped area is over 90 per cent (NARC, 2003) which do not have any sort of access to any type of irrigation.

Pakistan has made efforts to manage its water resources with care but facing increasingly water shortage. The country's current water storage capacity is 9 per cent, as compared to the world's average water storage capacity of 40 per cent. Without additional water storage capacity, the short fall will increase by 12 per cent over the next decade alone, as indicated by the Planning Commission of Pakistan (2007). It had been estimated that an additional 48 billion cubic meter of water would be required to meet the growing demands of agriculture and the country's economy by the year 2011 on-wards (GOP, 2007) as supported with the recent targets of increased agricultural production and food requirement for the country by the year 2030, in the wake of growing human population to 242.4 millions as forwarded by Shafiq Qadir *et. al* 2014.

Pakistan's agricultural output is closely linked with the supply of irrigation water. As shown in table below against the normal surface water availability at canal heads of 103.5 Million Acre Feet (MAF), the overall (both for Kharif and Rabi) water availability has been less in the range of 5.9 percent in the previous years (2003-04) to 20.6 percent (2004-05). However, it remained less by 2.5 percent in 2005-06 against the normal availability. Relatively speaking, Rabi season faced more shortage of water than Kharif during 2006-07 (Government of Pakistan, 2007).

Punjab being the most productive province of Pakistan, having irrigated as well as rain fed lands. Chakwal district in Punjab, 146 kms away from capital city Islamabad, was earmarked for this study. Two out of four tehsils were targeted namely Chakwal and Kallar Kahar. The topography of Chakwal district is mountainous consisting of salt range along with plane areas. Some villages are situated in valleys. Climate is generally cold in winter and hot in summer (from April-September in which June and July are extremely hot months wherein, temperature reaches up to 30-35 °C) .Winter prevails from October to March in

which December and January are extremely cold months, wherein temperature drops to its minimum at 0-5°C. Mostly rain is received in monsoon season. Agriculture is the dominant sector in which highest contribution is of cropping (Rabi & Kharif), followed by vegetables, livestock and poultry. Irrigation practices consist of deep boring, tube wells and turbines. Some parts of the district depend upon rain for agriculture. Horticulture is not a leading sector but trace amount of citrus trees are found. Due to decline in soil productivity and non-availability of water, farmers are switching over to livestock husbandry. The major threat to standing crops, as reported and observed are the wild boars.

Generally in Chakwal district the quality of drinking water varies and was of bad quality due to presence of sulphur. Soil was recorded mostly as sandy and clayey. Minerals like dolomite and granite were available in Chakwal district. Dharabi watershed located in Chakwal district of Punjab province was dominated. Total area of this watershed comprised 180 Sq. km. About 15 villages/dhokes located partially or fully linked with this watershed. In these villages the communities recorded were partially or fully organized which indicates that the farmers of the area were concentrating on natural resource management, in an organized way for rebuilding their watershed.

To explore the existing system, an exploratory survey was conducted, addressing the issues of presence and effectiveness of various development agencies, the natural resources of the area, the resource use pattern, dynamics of resource use, limitation of farmers in resource management, development works, labor efficiency issues, and marketing surpluses in the area of Dharabi watershed. Three villages in Dharabi water shed area were selected (i) Chak Khushi, (ii) Ratta Sharif and (iii) Kallar Kahar, former of which are rain fed and later one as irrigated.

Implementing methods and techniques for sustainable use of water, will improve the living standard of the communities, better food security, sustainable crop production, increased crop productivity, higher income level which will ultimately give better health facilities and education, with a broader vision towards improved agriculture fetching higher foreign reserves in the coming years as recommended by Planning Commission of Pakistan (2007).

The objectives of this study were:

i. To study the socioeconomic characteristics of both rain fed communities of water shed area, and of irrigated communities of water shed area.

ii. To find out the comparative economics of crops in relation to rain fed and irrigated areas.

MATERIAL AND METHODS

(a) Population and samples: Population of the study was rain-fed and irrigated areas of Dharabi dam in district Chakwal. Villages were categorized on the basis of differences in access to water resources and soil profiles. Two villages were selected purposely representing dam water availability and rain fed agriculture. A list frame was developed to select sample farmers using variables like number of household, family size, livestock population, size of land holding and status of their education etc. Sample size was finally decided on the basis of number of household in a village and cultivated area owned, as per following formula:

$$n = Nt^2\,\alpha V^2/(ND^2 + t^2\,\alpha V^2)$$

n= Required sample size.
N= Total number of farm household of the respective farm size.
D= Relative sampling error.
$t^2\alpha$ = Tabulated value.
V= Computed co-efficient of variation of cultivated area.

(b) Survey instrument: A comprehensive questionnaire was designed to gather data on socio-economic characteristics including profile of village institutions and road infrastructure, demographic conditions availability of basic facilities, land and land use pattern, agriculture production, farm machinery, soil type, water resources, rangelands utilization, marketing facilities and labor use etc. The questionnaire was thoroughly examined and discussed with other stake holders of project like ICARDA (for further improvements needed to obtain the required information) of this study.

(c) Pretesting: Through informal survey, based on title and in the light of objectives of study, the questionnaire covering important aspects of output and input cost components was prepared and was tested in field for accuracy. During pre-testing, some flaws and complications in questionnaire were observed and were removed in the final questionnaire given in annexure and the formal survey was conducted.

(d) Data collection and analysis: Data was collected not only in the project area but also from the Government Organizations and Non-Governmental Organizations (NGOs) about general characteristics of Chakwal district. Primary

information was obtained from selected farmers through structured questionnaire. The sampling frame of study consisted of 465 farmers, out of which 124 sample farmers were interviewed who responded and the information is detailed below:-

Table 1 Showing the stats of Respondents in survey of selected villages in Dharabi watershed area

Sr.#	Village	Community	Interviewed	Percentage
(i)	Kallar Kahar	Irrigated	60	48
(ii)	ChakKhushy	Rain fed	33	26.6
(iii)	Ratta Sharif	Rain fed	31	25.4

(i) **Data cleaning, coding, analysis:** Data analysis being an important phase of research was coded to transform huge amount of variables into meaning full form. Statistical Package for Social Scientist (SPSS) was used to analyze. Mainly averages, means and frequencies were calculated and were made presentable into the tabulation forms.

(ii) **Calculation of gross margins:** Revenues from output and costs of different variable inputs used were calculated. Gross margins were also calculated at farm level by taking a difference of the gross revenue and per unit variable cost. The contribution of each enterprise to farm profitability being that activity's gross margin; which is the difference between an activity's per unit revenue and variable input costs per unit, computed as:

$$G_j = r_j - c_j$$

Where r_j refers to an activity per unit revenue and c_j pertain to activities per unit variable input costs.

(iii) **Revenue calculations:** The revenue earned by any production activities are the type and quantity of outputs, and their market price. The types of output per activity were categorized into main product and by-product. Given the prices received for each output; the total revenue earned from each unit of activity x_j was measured as:

$$rj = \sum_{n=1}^{N} Pnjt \quad Ynjt$$

Where p_{njt} is the unit price of the nth output of activity j; Y_{njt} is the yield of the nth output produced from one unit of activity j t; and n = 1,...,N denotes the outputs.

(iv) **Costs calculation:** The total cost of the variable inputs used to produce one unit of each enterprise consists of money costs and opportunity costs. The

opportunity costs were estimated for the operations performed by owned farm machines, family labor and farm inputs (Farm yard manure and seed). The money costs were paid for inputs like, fertilizer, herbicides, insecticide, fuel, improved seed, casual hired labor, picking and transplanting. The total variable costs to produce an activity x_j were measured as:

$$cj = \sum_{i=1}^{k} Pijt \quad aijt$$

Where p_{ijt} is the unit price of the *i*th variable input applied to activity x_j in time period t; a_{ijt} is the amount if *i*th input used by activity x_j.

Misra (2001) emphasized on the need of an organization which would require complete sovereignty, right to interfere on natural resource policies, sufficient monetary resources and technical expertise for supporting rural communities directly or indirectly dependent on the watershed. Studies of the impact of watershed development program on farming community revealed that crops yield, moisture status, reduction in land slope, pasture yield, water levels in wells, and livestock production were improved after development. (Pendke *et al.* 1999). Bhakar *et al.* (2007) propoped that active participation of farmers in surveys, planning and post implementation stages was positively related with respondents' education, socioeconomic status, mass media exposure, extension contact and risk orientation.

Socio-economic studies on watershed community has thus revealed that improving the education, household standards, suitable training, water resources and management will increase crop and livestock production, nutrition, and income (Chand *et al.* 2003; Das *et al.* 2006; Dhyani *et al.* 2006; Padmavathi *et al.* 2002).

RESULTS AND DISCUSSION

(a) Household head age: Age as noted, being important factor, which affect the potential employment and mobility status of respondents, the average age of the household heads was same almost in three selected sample villages as 54 years approximately shown in Table 4. It was observed that households were actively involved in farming practices and decision making in farm and life matters.

Table No.2 Shows village wise household average head age of the respondents of the study area.

Name of village	Household head age (years)		
	Average	Maximum	Minimum
Chak Khushy	55	85	30
Kallar Kahar	54	70	28
Ratta Sharif	56	85	32

Source: ICARDA Survey, 2007

(b) Family composition and size: The information regarding family size and composition of the respondents collected during field survey as given in Table 5, the average family size was found to seven persons. The main reason for large average family size was joint family system. The study shows the dependency of single earning person.

Table No. 3 showing the village wise family composition and size in the study area

Name of village	Family composition (%) and size (number)				
	Percentage		Average members	Adults >16	Children < 16
	Single	Joint			
Chak Khushy	0	100	7.0	2.7	4.3
Kallar Kahar	1	99	7.3	4.7	2.6
Ratta Sharif	0	100	7.5	4.6	2.9

Source: ICARDA-survey-report(2007-8)

(c) Demographic characteristics: It was observed during field survey that main occupation was laborers in rain fed areas of Dharabi watershed the reason behind this was unavailability of irrigation water and un affordable prices of other agricultural inputs due to which farmers lose interest in agriculture farming. While in irrigated areas main occupation was farming as shown in Table 2, people were cultivating their lands more efficiently than farmers of un-irrigated areas due to timely and adequate availability of water and other agriculture inputs. The study results showed that there was a shift in occupation from agriculture farming to laborers in rain fed areas of selected villages. Tenancy farming is highest 33 percent in Chak Khushy as shown in Table 2. The main reason for highest tenancy farming percentage was un-consolidated land holdings. While it was minimum in Ratta Sharif with 2 percent mainly because of consolidated land holdings.

Table 4 shows the general description of the selected villages of the study area

Name of villages	Population	Main occupation	No of household	No of farming families	No of tenants	% of tenets	Income classes
Chak khushi	1500	Laborers	300	200	100	33	Poor
Kalar Kahar	3500	Farming	2000	1600	400	20	Poor, middle
Ratta Sharif	900	Laborers	280	240	40	2	Poor

Source: ICARDA-survey-report(2007-8)

(d) Income status of respondents: Most of the people in all of the villages are mediocre and poor people. They are either laborers or farmer. Their social status is poor because they cannot afford to purchase inputs such as fertilizer and other crop inputs to increase their crop yield. So due to less profit majority of them had left agriculture and switched over to laborers. As compared to ChakKhushy and Ratta Sharif people of Kallar Kahar were better off with 70 percent poor and 30 percent mediocre whereas in Chak Khushy and Ratta Sarif 90 percent are poor and only 10 percent are moderate as reported by the community in Table 5. The main reason for better living standard of Kallar Kahar farmers were presence of irrigation system in that area.

Table 5 showing the Village wise income status of respondents in the study area

Sr.#	Name of village	Income status (percentage)	
		Moderate	Poor
(i)	Kallar Kahar	30	70
(ii)	ChakKhushy	10	90
(iii)	Ratta Sharif	10	90

Source: ICARDA-survey-report(2007-8)

(e) Village wise educational level of the respondents in the study area: Education plays an important role in the overall growth and development of any country. Level of education affects the planning and managerial abilities of the farmer in decision making. The literacy rate of the sample respondents was also explored the detail of which is given in Table 7. The literacy rate in Kallar Kahar is far much better than reported by the other communities. Middle school and one Cadet college, one private and one government collages were found in Kallar Kahar. In Ratta Sharif the number of educational institutes were increasing and

institution were being made by the government sector .Only one person in Chak Khushy was M.A. and two people in Ratta village had high school education.

A haunting figure of 87 percent of sample respondents was illiterates in Chak Khushy. Lack of educational institutions, poor economic conditions and lack of access to the far located institutions were observed to be the conspicuous reason for low literacy rate in the study area. Average number of schooling years, in all of three villages, was same with highest level in Chak Khushy followed by Ratta village. Ratta Sharif had maximum number of respondent with ten years of education.

Table 6 showing village wise education level of respondents in the study area

Sr.#	Name of village	Educated (percentage)	Un educated (percentage)
(i)	Kallar Kahar	36	64
(ii)	ChakKhushy	13	87
(iii)	Ratta Sharif	33	67

Source: ICARDA-survey-report(2007-8)

(f) Farm traction power in selected villages of Dharabi watershed: It was obvious from the results in Table 7 that all farmers used tractor to cultivate their lands and no one was using traditional methods of cultivation. Most of them (98 percent) reported to hire tractors for cultivation.

Table 7 showing village wise farm traction power in Dharabi watershed area.

Name of village	Bullock (Percentage)	Tractor (Percentage)	
		Owned	Rented
Chak Khushy	0	0	100
KallarKahar	0	1	99
Ratta Sharif	0	1	99

Source: ICARDA-survey-report(2007-8)

(g) Irrigation resources: Irrigation water serves the basic need for any crop. In study area it was observed that in Chak Khushy and Ratta villages source of irrigation was only rain water and no farmer had access to dam water or tube well, at their lands whereas in Kallar Kahar, 70 percent of the farms located at head side of Nikka dam were irrigated while 20 percent on the tail end did not receive

water. This was due to the breakage of water pipe coming from Nikka dam. Almost 10 percent of the farmers had bores or tube wells as presented in table 8.

Table 8 showing village wise irrigation source in the selected area.

Name of village	Irrigation source percentage		
	Rain	Dam	Tube well
Chak Khushy	100	0	0
Kallar Kahar	20	70	10
Ratta Sharif	100	0	0

Source: Survey, 2007

(h) Transportation means: The main source of transportation from one place to another was Toyota Hiace for majority of the people but few had their own means of transportation, like motor car or motor bike. Toyota Hiace was used by 98,. 97 and 98 percent respectively by the villagers of Chak Khushy, Kallar Kahar and Ratta Sharif. People approached to the main road by foot and then took some sort of lift or any public transport to reach their ultimate destination. This showed that people were poor in Chak Khushy and Ratta villages as compared to Kallar Kahar, as presented in Table 9 below:-

Table 10 shows transportation means in selected villages of the study area.

Name of village	Toyota Hiace	Private
ChakKhushy	98	2
Kallar kahr	97	3
Ratta Sharif	98	2

Source: ICARDA-survey-report(2007-8)

(i) Size of operational holdings: Land being a scarce resource, its optimal use is very important. Farm size was one of the major determinants of financial status of the farmers, which in turn affected farmer's ability to adopt modern farming practices. Operational land holding played vital role in the family laborers employment as well as income generation. The main problem in the research area was small and fragmented land holding which resulted in management difficulties and ultimately production. In table-11 operational holding sizes were categorized into four classes namely (i) 0-50 kanal, (ii) 50-100 kanal, (iii) 100-200 kanal and (iv) above 200 kanal. In Chak Khushy 76 percent farmer fell in 0-50 kanal category, 12 percent farmers in 50-100 kanal category, 09 percent farmers in 100-200 and only 03 percent farmer fell in above 200 kanal categories.

In Kallar Kahar 67 percent farmers were in the range of 0-50 kannal, 12 percent farmers within the range of 50-100 kannal, 17 percent farmers in the range of 100-200 kanal and 05 percent farmer were above 200 kanals. In Ratta Sharif 52 percent farmers were in the range of 0-50 kanal, 26 percent farmers were in the range of 50-100 kanal, 22 percent farmer operated in the range of 100-200 kanal and no farmers had land above 200 kanals. This showed that land size varied in Kallar Kahar ranging from 50-200 and above. Ratta had no big farmer. Whereas Kallar Kahar had maximum numbers of small farmers with land holding less than or equal to 50 kannals. Fragmented lands were mainly found in Chak khusy, moderately in Ratta Sharif and scarcely in Kallar Kahar. According to the respondents if some action was taken by the government to consolidate the land, it could bring definite change in production level and income status of the dwellers.

Table No. 11 showing size of operational land holdings of selected villages (Percentage)

Name of Village	0-50 K	50-100 K	100-200 K	Above 200 K	Total
ChakKhushy	75.75	12.12	09	03	33
Kallar Kahar	66.66	11.6	16.6	05	60
Ratta Sharif	51.61	25.80	22.58	0	31

Source: ICARDA-survey-report(2007-8)

(j) **Land types:** It was observed that sloppy lands were subjected to different kinds of erosion problems. In selected villages of Dharabi watershed, Chak Khushy and Ratta Sharif farmers had more eroded land than Kallar Kahar. The major reason reported according to the farmers of Chak Khushy and Ratta Sharif was the negligence in the past when land started to erode. No one paid attention to it and it continued and now was almost eroded and out of limits of the individual farmer to refill its eroded land or reclaim its land from local weeds.

Table 12 showing the Land types in selected villages of Dharabi watershed (percentage).

Name of village	Plain	Eroded	Saline
Chak Khushy	20	80	0
Kallar Kahar	40	60	0
Ratta Sharif	10	90	0

Source: ICARDA-survey-report(2007-8)

(k) Use of uncultivated land: In Chak Khushy, all the uncultivated land being plain but due to weed called locally as KUNDAR which was in fact a water borne weed, had deep roots so could not be easily eradicated. Other than this KEEKAR and NARIAN were also found whereas in Kallar Kahar and Ratta villages majority of the uncultivated land was eroded and a fraction was plain, unusable land. The main reason of eroded land being mountainous in nature, and due to rain, soil eroded and was not reclaimed which kept on increasing up to the level to gullied area. There was no salinity problem in the study area. As appears in the table 13.

Table 13 showing village wise use of uncultivated lands in Dharabi watershed. (Percentage)

Name of village	Grazing	Fuel trees	Fodder trees	Waste	Total
Chak Khushy	10	15	0	75	100
Kallar Kahar	60	40	0	0	100
Ratta Sharif	50	50	0	0	100

Source: ICARDA-survey-report(2007-8)

(l) Land allocation to crops: In this study most of the farm area was allocated to wheat crop (for sustainable agriculture), however in Kallar Kahar, 30 percent of the farmers had reported to allocate their land to commercial cash crops, 10 percent to fodder and 60 percent to wheat whereas in other two villages 93 percent land was under wheat production and 10 percent for fodder (for their livestock). Farmers of Ratta and Chak Khushy produced wheat sufficient only for their home/family consumption.

Table No.14 shows land allocation to crops in villages of Dharabi watershed area.

Name of village	Wheat	Millet/Fodder/others	Groundnut	Total
Chak Khushy	90	10	0	100
Ratta Sharif	93	7	0	100
Kallar Kahar	60	10	30	100

Source: ICARDA-survey-report (2007-8)

(m) Crops of rain fed and irrigated areas: Wheat, as a staple food was cultivated by majority of farmers either having small land holding or large. In un-irrigated areas, like Chak Khushy and Ratta Sharif farmers were practicing rain fed agriculture and only wheat and fodder crops grown. They did not grow groundnut due to the absence of irrigation system. Weeds infestation on their land and wild

animals attack was reported. No crop rotation or agronomic practices were followed, but grew local verities and use their own unimproved seeds.

Irrigated area like kallar kahr had shown availability of more variety of crops and all farmers were practicing multi cropping in irrigated areas. Wheat was sown by majority of farmers whereas maize, millet, groundnut and vegetables were also grown. Vegetables were generally sown by those who received water from Nikka dam. Wheat occupied 60 percent of the total cultivated area in Kallar Kahar. Those farmers, near the dam, were more benefited as compare to those farmers located near the tail (who do not get water from Nikka dam) in WARA BANDY system. In addition to this the pipe line of dam was also worn out/damaged, causing great damage to effective farming system and practices with the results of discrimination in the community.

Table15 shows village wise crops cultivation by the respondents in Dharabi watershed (%).

Name of village	Wheat	Wheat & Groundnut	Vegetable	Fodder	Total
Kallar Kahar	45	38	2	15	100
Chak Khushy	90	0	0	10	100
Ratta Sharif	88	0	0	12	100

Source: ICARDA-survey-report(2007-8)

Table 16 showing sale and purchase pattern of crops in Kallar Kahar area (Respondent percentage).

Crops	Surplus/Sale	Purchase/Shortage
Wheat	5	1.6
Groundnut	33	0

Source: ICARDA-survey-report(2007-8)

(n) Crop production of irrigated and rain fed area of Dharabi water shed:

Crop production of irrigated areas was almost double than in rain fed areas. Groundnut being a cash crop of Chakwal district, was also sown to earn good profit. In irrigated area more input use like fertilizer, pesticide and improved seeds also helped in getting higher production. On the other hand rain fed area production was half of the irrigated areas as all output depend upon rain fall. Use of fertilizer in rain fed does not assure high production until timely and adequate amount of rainfall was received. So according to the farmers of rain fed area of Dharabi watershed using fertilizer, pesticide or improved seed was nothing more than a sunk cost, because the average yield was less in rain fed area as compared to irrigated area.

Table 17 showing sale and purchase pattern of crops in Chak Khushy (percentage).

Crops	Surplus/sale	Purchase/shortage
Wheat	0	06
Groundnut	0	0

Source: ICARDA-survey-report (2007-8)

(o) Sale and purchase pattern of crops in selected villages: In rain fed area like Chak Khushy farmers usually practiced subsistence farming and did not sell wheat rather 06 percent had purchased wheat as shown in table 18, while no groundnut was grown being difficult for the farmers to protect their crop from wild boar. In Kallar Kahar, 05 percent of the farmers had sold and 1.6 percent had purchased wheat while 33 percent of the respondents sold groundnut as shown in table 16. The situation in Ratta Sharif was little better than Chak Khushy with 02 percent respondents selling wheat and 02 percent had purchased wheat. Only 03% respondents had sold groundnut. It was assumed that Kallar Kahar was self sufficient in food with less food security threats whereas Ratta was self sufficient in food and Chak Khushy having threat to food security.

Table 18 shows the sale and purchase pattern of crops in Ratta Sharifvillage of this area

Crops	Surplus/Sale	Purchase/Shortage
Wheat (Respondents)	2	3
Groundnut	8	0

Source: ICARDA-survey-report (2007-8)

(p) Soil condition of the selected villages: Chakwal district being well known for stony soils. The soil conditions of the selected villages in Dharabi dam watershed area was mostly sandy to clayey. Most of the peoples of watershed were of the view that soil degradation was increasing with the passage of time. The extent of erosion varied differently in different villages, from low to high. In village like Chak Khushi the soil erosion was low, while its intensity increased as we moved to Kallar Kahar which resulted in formation of Gullies of 3-5 feet, presented in table 19.

Table 19 shows the soil conditions of selected villages in Dharbi watershed.

Name of villages	Stone availability	Soil type	Soil degradation Trend	Extent of erosion	Gullied area (feet)
Chak Khushi	No	Sandy	Increasing	Low	3-5
Kalar Kahar	Yes	Sandy	Increasing	High	Less than 3
Ratta Sharif	Yes	Clay+ sandy	Increasing	Low	No

Source: ICARDA-survey-report(2007-8)

(q) Water condition in selected villages of Dharabi watershed: In Dharabi watershed, generally farmers used water of streams and springs for irrigation purposes. Total numbers of wells in the watershed are 132 and average water table depth was 96 feet. Water table depth varied with stream as shown in table 20. In Kallar Kahar water table depth was low while in Ratta Sharif it was too high. In Dharabi watershed, generally farmers used water of streams and springs for irrigation purposes. Total numbers of wells in the watershed were 132 and average water table depth was 96 feet.

Table 20 shows village wise water resource availability in Dharabi watershed area.

Name of villages	Natural water source for agriculture	No. of wells	Water table (feet)	Water table variation	Variation months
Chak khushi	Rain	0	35	Yes	June, July
Kalar Kahar	Spring+ Stream	2	15	Yes	June, July
Ratta Sharif	Rain	4	150	Yes	June, July

Source: ICARDA-survey-report(2007-8)

(r) Availability of agricultural machinery in the study areas: The total numbers of tractors in the villages under study of watershed area were 53 out of which 50 were in Kallar Kahar, 02 in Ratta Sharif and one was present in Chak Khushy. Twenty five (25) trolleys in Kallar Kahar, 01 in Ratta Sharif and no trolley was found in Chak Khushy. These tractors were used for agricultural as well as other purposes like loading and dragging purpose etc. detail of which can be seen in table 21.

Table 21 showing the availability of agricultural machinery in selected villages of Dharabi watershed.

Name of villages	No of tractors	Tractors with shower	Tractor with front blade	No of trolleys	Availability of Land leveler
Chak khushi	1	1	1	0	No
Kalar Kahar	50	25	25	20	Yes
Ratta Sharif	2	2	0	1	No

Source: ICARDA-survey-report(2007-8)

(s) Land resource availability of selected villages: The total area of villages under study in Dharabi watershed was 1,03,362 kanals out of which cultivated area was 35 percent and uncultivated area was 64 percent. The total land resources owned by the watershed communities of Chak Khushy was 25,008 kanals of which 31 percent were cultivated and 69 percent uncultivated. Ratta Sharif total owned land resource was 15,544 kanals out of which 25 percent were cultivated and 75 percent uncultivated, as shown in table 22, states that 64 percent of the total area 1,03,360 kanals was uncultivated which was more than half and total population was being fed by just 36 percent. If uncultivated land was transformed into useful cultivated land, these research sites could produce double the agricultural production.

Table 22 showing the land resource availability of selected villages in Dharabi watershed.

Name of villages	Total area of village(k)	Cultivated area (k)	Uncultivated (k)
Chak khushi	25008	8000 (31)	17008 (69)
kalar Kahar	62808	25120 (40)	37680 (60)
Ratta Sharif	15544	4000 (25)	11544 (75)
Total	**103360**	**37120 (35)**	**66232 (65)**

Source: ICARDA-survey-report(2007-8)
Note: Figs in parenthesis are percentages

(t) Gross margin of wheat in irrigated vs. non-irrigated areas: Gross margins of wheat grown both on irrigated and rain fed lands were estimated. Results showed that gross margins of wheat at irrigated lands were more than three times higher (Rs 846/k at rain fed and Rs.2647/k on irrigated land) than wheat sown at rain fed lands. However standard deviation showed that gross margin of wheat greatly varies at both types of lands, as shown in Table 24.

Table 24 showing gross margin of Wheat in irrigated Area of Dharabi watershed. (Rs/k)

Area	Numbers	Mini	Maxi	Mean	Std. Deviation	cv
Irrigated	60	-1272	2270	2647	3935	.67
Un-irrigated	64	-500	3104	114	541	.21

Source: ICARDA-survey-report(2007-8)

DISCUSSION

Singh (2000) studied the relevance of socio-economic household on watershed . He gathered data on caste, economic groups, agriculture, irrigation, livestock, wage earning, migration and indebtedness during 1997. The results show that the combination of different factors, composition of family, skill, quality of the land and irrigation determines the annual per caput annual income of the families and the income from a particular source. These results are inconformity with Bhakar *et. al.,* 2007 who reported watershed positively affects socioeconomic condition of farming community. Gol *at., al.* 2010 also stated that demographic structures affects the land use patterns.

CONCLUSION

i. Socio economic uplifts of any area depend upon its resource mapping for planning appropriate interventions.

ii. Available land resource could be used alternatively by applying different technological packages.

iii. The research area was having both irrigated and rain fed land type.

iv. The study concludes that rain fed area were more neglected area by the government as compare to the irrigated area due to differences in geographical locations.

v. Rain fed area lack in agriculture machinery, easy access to agriculture inputs like fertilizer, improved seeds, pesticide, herbicide, weedicide, fragmented lands, eroded soil, weeds, lack of water storage bodies and agriculture extension agents.

vi. Some problems were shared by both irrigated and non-irrigated areas like lack of modern techniques and technology, damage to crops by wild animals like Pigs and Porcupines, lack of pure drinking water facility

which restricts socio- economic development of the villages under study of Dharabi watershed.

vii. Comparatively irrigated areas are much better off than rain fed, mainly due to water availability and access to credit.

RECOMMENDATIONS

i. Mini dam or water storage bodies should be constructed, especially in rain fed areas of the villages under study of Dharabi watershed.

ii. Counterproductive influence should be minimized to accelerate the development of socio economic aspects and to give chance to poor farmers to become better off in both of the study area villages of Dharabi watershed.

iii. Easy, cheap and timely access of agricultural inputs be made available in both areas of our study.

iv. Full land resources use should be maximized for achieving high productivity and prosperity goals in all villages of Dharabi watershed.

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