First Report of ethnobotanical studies of tehsil Noorpur Thal, District Khushab, Punjab, Pakistan

Zaheer Yousaf
zaheeryousaf56@yahoo.com

Abstract — The study is based on gathering of information by interviewing villagers, herbalists, hakims and farmers, following a preset list of questions followed by analysis of the data collected. Plant samples were gathered and their morphological characteristics described. Their various uses including medicinal uses, where reported were gathered. The present work is a significant contribution to the existing knowledge because ethnobotany as a interdisciplinary science understanding of local social dynamics, institutions and different values attributed to resources. These values may be symbolic, religious or political for a given society, while same plant resources may represent only an economic value for our social group. Fuel wood needs are also met by collecting dried fodder branches, by products of crops and dried animal dung. It is recommended that botanical gardens of medicinal plants should be established. Data was analyzed at $P(0.05-5\%)$.

Keywords — Interviewing Villagers, Medicinal Uses, Ethno botany, Plant Samples, Conservational Reserves, Botanical Garden, Products of Crops and Animal Dung.

I. INTRODUCTION

From ancient time, plants are being used in various diseases. Many of today’s drugs have been derived from plant sources. Pharmacognosy is the study of medicinal and toxic products from natural plant sources. More than six thousand species are used as medicines drives from medicinal plant are $43$ billion. More than 75% of Pakistani population depended on tradition medicines for all are most of its medicinal needs. Ethnopharmacological study not only envisage the possibility of identifying new herbal drug, but also bring on record the hidden knowledge confided to traditional society all over the world (Leporatti 1990) bhattari, 1992 padhye at al 1992 , yang 1992, omino et al, 1993, Gils et al, 1994, bhanday et al, 1997, Verma et al, 1998).

Study Area
The very word Khushab, derived from two Persian words “Khush” and “Aab” meaning good or peasant potable water. District Khushab is one of the four districts of Sargodha Division. The district lies between north latitude 31-33 to 32-43 degree and east longitude 71-35 to 72-37 degrees. The average length of the District from north to south is about 116 Kilometers: while its breadth from east to west is about 56 kilometer. The District comprises an area of 1,627,688 acres or 6,511 sq. Kilometer.

The few trees to be found in the dry and sandy that are chiefly Jund, (Prosopis cineraria (L) Druce), which is found in graves protected by the reputation of some departed scunt: stunted kikar, rarely found the round ponds and a grave of beri (ZizyphusnummulariaBurm.F.) trees found the town of Nurpur, which are specially protected by a clause in the village administration paper. The characteristic bushes of the region are the lana (salaola), akk (Calotropis pro ceru R. Br.) and harnal (paganumharmala 1.) which have already been described and the phoy (Calligonmpolygonoidea Linn.) a good fodder plant, little found except in RakhNurpur, but (Pauderia pilosa) a low whitish plant with flower heads like catkins, khipp, (Crotalaria burhia) some time used for making ropes for temporary use and summ and kartumma (Citrulus colosynthis (L.) Shrad.) with its trailing stems and beautiful green and yellow orange likes fruit scattered in the profusion over the sandy hills. Their taste is very bitter, but goats eat them and medicine for horses is prepared from them to prevent indigestion.

In the past only cultivation consisted of small patches of cheap millets and pulses, or very inferior watermelons. But it has since been discovered that excellent grass of crops can be raised in an ordinary winter and year by year larger areas are devoted to raising them, the change from pasture to agriculture as the principal means of livelihood is going on apace. The resulting development of land is, of course, over-shadowed by the brilliant success of the lower Jhelum Canal, but is nonetheless remarkable.
In the flooded lands along the rivers lei or pilchi (*Tamarix dioica* Roxb. Ex Royh) springs up considerable thickets and is used for wattling, baskets and roofs. The akk (*Calotropis procera* R. Br.) is very common in sandy soil. It is also useful for snakebite (Ajibade et al., 2005).

II. METHODOLOGY

The survey was conducted from March, 2003 to February 2006. The methodology was based on interviews using checklist and questionnaire of information (Martin, 1995). The interviewees in the villages were chosen at random. Total No of interviewees conducted are 750 consists of 400 males and 350 females. The interviewees were landholders (zamindars), Agriculturists, pansars, Hakims and Farmers, and most of them were mainly graduates and Government employee. In the first step, detailed knowledge about the local and indigenous people was collected. A regional study on the epidemiology tradition medicines and ecology of the people and their environment was prepared. In order to prioritize plant collectors, a number of international data basis were searched to obtain all the relevant ethno-medical, biological and chemical information on the plant known to be used in that region.

Following parameters were adopted for the study:

A. ETHNOMEDICINAL USES

1. Uses of herbal medicinal
2. Parts of the plants used
3. Ailments treated
4. Success of use
5. Source of supply
6. Average annual stock (quantity)
7. Average annual sale (quantity)
8. Types of people treated
9. No. of people treated per day
10. Trend in use of medicinal plants

B. FODDER USES

1. Fodder priority
2. Fodder effects
3. Animal types
4. Preferred pats

C. ETHNOBOTANICAL USES

1. Vegetables and pot herbs
2. Fruit yielding
3. Poisonous plants
4. Method of use
5. Prices per KG.
6. Plant grown/cultivated
7. Plant material stored
8. Quantity sold per year
9. Sold in the form (dry/fresh)
10. Used in the form (dry/fresh)
11. Total number of species traded
12. Harvesting season
13. Method of preparation (infused/boiled/distilled/fresh juice)
14. Details of preparation
15. Method of internal application (infusion/decoction/syrup chewed)
16. Method of external application (poultice, fixed oil, lotion cream)
17. Age groups of people using the species
18. Health maintenance
19. Types of livestock treated
20. Livestock ailment treated
21. Use of herbs in combination with other herbs
22. Period of storage of plants/herbs
- Processing Additive used
- Domestic, community-wise and market value Species preferred for sale
- Average price per unit
- Source of fuel for domestic purpose
- Average consumption of fuel per day for each household

D. FUEL SOURCES AND ITS CONSUMPTION
- Source of fuel for domestic purpose
- Average consumption of fuel day for each household
- Fuel types (i.e. fuel-wood, kerosene oil, LPG, crop residues, cow-dung, wood-waste, charcoal)
- Average monthly fuel requirement in summer and winter seasons

Table 1: Species used for different ailments

| S.No | Name of species | Scientific Name | Part used | Illness | Success |
|------|----------------|----------------|-----------|---------|---------|
| 1.   | AK             | Calotropis procera R.Br. | Stem | Joint Pain | Comforts |
| 2.   | Harmal         | Peganum harmala L. | Seed | Abdominal Pain | Comforts |
| 3.   | Akashbel       | Cuscuta reflexa Roxb. | Stem | Phorey | Comforts |
| 4.   | Tumma          | Citrullus colocynthus (L.) Schard | Seed Fruit | 1. Constipation 2. Stomach ailment 3. Immunity for Rani Khet Diseases 4. Sun stroke/Heat 5. Abdominal congestion 6. Amenorrhea 7. Ascites 8. Asthma 9. Billousnes 10. Cerebral congestion 11. Elephantiasis 12. Epilepsy 13. Facial paralysis 14. Fever 15. Gout 16. Hepaticcongestion 17. Jaundice 18. Leprosy 19. Liver dibility 20. Neuralgic complication 21. Paralysis | 1. Comforts 2. Very Effective 3. Very Effective 4. Cold effect |
| Root Poultec of root Juice Oil of Seed | 22. Rheumatism 23. Sciatica 24. Visceral congestion 25. Inflammation of breast 26. Remedy of dropsy Snake bites scorpion stings and bowl complaints (dysentery, diarrhea) Epilepsy and for growth and blackening of hair |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------|
| 5. Khoob Klan (Chuniakha) Sisymbrium irio Crantz ex Steud Seed | 1. Typhoid 2. Small Pox (Chechak) 3. Chest debility, cholera, cough, fever, harassness vocal organ debility, vomiting | Removes Small Pox (chechak grains) |
| 6. Saunf Foeniculum vulgare Miller Whole Plant | 1. Digestion problem 2. Gas Trouble 3. Female illness 4. Nervous disease | 1. Increases Digestion 2. Gas trouble recovers. 3. Treatment. 4. Comforts. |
| 7. HamiKaKhaj Cistanchterabulos a Wight Whole Plant | Blood Purifier | Comforts |
| 8. Jawah Carum copticum Benth Whole Plant | Blood Purifier | Comforts |
| 9. Boophali Corchorus aestuans Linn. Whole Plant | Stomach and liver heat | Patient becomes healthy |
| 10. Lauhurian Tecomella undulate Whole Plant | Defect in Uterus | Patient becomes healthy |
| 11. Kahnu Whole Plant | Defect in Uterus | Patient becomes healthy |
| 12. Bhakra Tribulus camalulensis. L Seed | Gall Bladder illness, Kidney Allergy | Most successful |
| 13. Boophali Corchorus aestuans Linn. Whole Plant | 1. Maleness in Man 2. Liqueria | Successful |
| 14. Hareer/Arhar Cajanus cajan L Root | Spermatorrhoea | Successful |
| 15. Asgandh/IksinNeelwat Withania somnifera L. 1. Root Decoction | 1. Weakness of sexual organ. 2. Premature ejaculation 3. Leucorrhoea and frequent miscarriage (ladies) 4. Emaciation (women and children) 5. General debility 6. Glandular swelling 7. Leucoderma | Successful |
| No. | Plant Name | Scientific Name | Part Used | Treatment Purpose                                                                 | Description                                                                                           |
|-----|------------|-----------------|-----------|----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| 16  | Puthkanda  | Achyranthes aspera L. | Root     | 14. Impotency                                                                     | Successful                                                                                             |
| 17  | Bathu      | Chenopodium album L. | 1. Cooked leaves, 2. Leaf extract, 3. Root powder | 1. Urinary troubles and colic, 2. Piles, 3. Coughed, 4. Worms | Successful                                                                                             |
| 18  | Drunk      | Polygonum plebijum R.Br. | 1. Plant Decotion, 1. Plant ash + Oil | 1. Colic complaints, 1. Eczema, 3. Spermatorrhoea | Successful                                                                                             |
| 19  | Jau        | Hordeum vulgare Linn. | Leaf Juice | Cataract, 1. Jaundice, 2. High fever                                               | Successful                                                                                             |
| 20  | Jund       | Prosopis cineraria (Linn) Druce | Leaves | Leucorrhoea, 1. Spermatorrhoea, 1. Jaundice, 2. High fever                         | Successful                                                                                             |
| 21  | Mako/MirchBooti | Solanum nigrum L. | 1. Leaf paste and branches, 2. Whole plant Decotion | 1. Jaundice, 2. High fever, 1. Spermatorrhoea | Successful                                                                                             |
| 22  | Kashmiri Kiker | Prosopis julflora Swartz | | |                                                                                                       |
| 23  | Pilchi/Lei/Frash | TamarixdlocaRoxb. ex Roth | 1. Bark (Bitter and Tonic) | 1. Annal Fisher, 2. Cough, 3. Diarrhoea, 4. Dysentery, 5. Pectrol Affection, 6. Piles, 7. Ulcers, 8. Leucorrhoea, 9. Spoleen Trouble, 10. Leucoderma | All kinds of fever particularly (i) Pneumonia, (ii) Malaria, (iii) Typhoid                                                                 |
| 24  | Chiraita   | Swertia chiraita | Whole plant and Decotion | All kinds of fever particularly (i) Pneumonia, (ii) Malaria, (iii) Typhoid |                                                                                                       |

*Table 2: Ethno-botanical uses of different plant species*
| S. No | Local Name | Scientific Name | Part Used | Fuel Wood | Timber | Fodder |
|-------|------------|-----------------|-----------|-----------|--------|--------|
| 1.    | Shrin      | Albizia lebbeek (L.) Willd | Leaves & Wood | Excellent Fuel | Agricultural implements | -do- |
| 2.    | Kiker      | Acacia nilotica L. | Leaves & Wood | Excellent Fuel | Agricultural implements | -do- |
| 3.    | Beri       | Zizyphus numularia (Burm.f.) | Leaves | - | - | -do- |
| 4.    | Shisham    | Dalbergia sisoo Roxb. Ex DC. | Leaves | - | - | -do- |
| 5.    | Khagal     | Tamarix dioica Roxb. ex Roth | Stem | Fuel | Building | - |
| 6.    | Sufeda     | Eucalyptus blobulus | - | Building | - |
| 7.    | Channa     | Cicer arietinum L. | Seed & Stem | Fuel | - | Fodder |
| 8.    | KhoobKalan | Sisymbrium irio Cranz ex Stued | - | - | - | -do- |
| 9.    | Jund       | Prosopis cineraria (L.) Druce | Stem | Fuel | -do- |
| 10.   | Gowara     | Cyamopsis tetragonoloba L. | Stem | Fuel | -do- |
| 11.   | Bursin     | Trifolium repens L. | Except roots | - | - | -do- |
| 12.   | Jowar      | Sorghum bicolor (Linn.) Moench | Except roots | - | - | -do- |
| 13.   | Bajra      | Pennisetum typhoideum (Burm. F.) Staff & Hubbard | Except roots | - | - | -do- |
| 14.   | Loosen     | Trifolium alexandrianum L. | Except roots | - | - | -do- |
| 15.   | Jowadar    | Avena sativa Linn. | Except roots | - | - | -do- |
| 16.   | Kashmiri Kiker | Prosopis julifora (Sw.) DC. | Except roots | Fuel | Construction | Fodder paper and cosmetic industry |
| 17.   | Wheat      | Triticum aestivum Linn. (Kanak) | Hay/Stem | - | - |
| 18.   | Sarsoon    | Brassica comperis L. | Stem/Leaves | - | - | -do- |
| 19.   | Kallar grass | Leptochola fusca | Stem/Leaves | - | - | -do- |
| 20.   | Juo        | Hordeum vulgare Linn. | Upper part | - | - | -do- |
| 21.   | Gana       | Saccharum spontaneum Linn. | 1. Stem 2. Thin end of the stock (Tili) 3. Shea thing petiole after being burnt at the lower end beaten with a mallet yield a fiber (Munj) | 1. Thatching and making chairs 2. Making baskets and screens (sirk) 3. Munj is twisted into ropes | |
| 22.   | Kah        | Saccharum spontaneum Linn | 1. Grazing for Buffalos 2. Making brushes 3. Use to strew on the floors of mosques | |
| 23.   | Dhub       | Desmostachya bipinnata (L.) stapf | | | Making ropes |

**MARKET SURVEY**

*Table 3: Prices of different species*
| S.No | Name of Species                  | Local Name       | Qty (Kg) | Price (Rs.) |
|------|----------------------------------|------------------|----------|-------------|
| 1    | Peganum harmala L.               | Harmel           | 1        | 50          |
| 2    | Cusuta reflexa Roxb.             | Ahashbel         | 1        | 500         |
| 3    | Citrullus colocynthus (L.) Schrad.| Tumma            | 1        | 50          |
| 4    | Tribulus camalduensis L.         | Bhakra           | 1        | 100         |
| 5    | Calotropis procera R.Br.         | Ak               | 1        | 1000        |
| 6    | Eucalyptus globules              | Sufeda           | 40       | 110/(2.7/K.g) |
| 7    | Tamarix dioica Roxb. ex Roth     | Khagal           | 40       | 100 (2.5/kg) |
| 8    | Dalbergia sissoo Roxb. ex DC.    | Shishum          | 40       | 200 (5/kg)  |
| 9    | Citrulus colocynthus (L.) Schrad.| Tumma            | 1        | 15          |
| 10   | Trianthma portulacastrum L.      | Biskhapra        | 1        | 30          |
| 11   | Acacia nilotica L.               | GondKiker        | 1        | 40          |
| 12   | Sisymbrium mirioCantex Steud     | KhoobKalan (Chaniakha) | 1  | 50          |
| 13   | Cicer arietinum L.               | Channa (Black)   | 1        | 20          |
| 14   | Cicer arietinum L.               | Channa (White)   | 1        | 40          |
| 15   | Foeniculum vulgare Miller        | Sounf            | 1        | 20          |
| 16   | Zizyphus nummularia (Burm.f.)    | Beri             | 1        | 3           |
| 17   | -                                | Lahurian         | 1        | 1500-28000  |
| 18   | Corchorus astuans Linn.          | Boophali         | 1        | 65          |
| 19   | Peganum harmala L.               | Harmel           | 1        | 40          |
| 20   | Tribulus calendulensis L.        | Bhakra           | 1        | 40          |
| 21   | Plantago psilliumForssk.         | Isbaghol         | 1        | 80          |
| 22   | Tribulus cameldulensis L.        | Bhakra           | 1        | 20          |
| 23   | Corchorus astuans Linn.          | Boophali         | 1        | 150         |

**Statistical Analysis**

Table 1: Variation in the price of fuel yielding species by using ANOVA Statistical Analysis of the price of fuel yielding species of Thal

| REPPLICATI | Prices | Total |
|------------|--------|-------|
|            | 50     | 40    | 20   | 110  |
|            | 50     | 50    | 65   | 165  |
|            | 15     | 20    | 40   | 75   |
|            | 30     | 40    | 40   | 110  |
| TOTAL:     | 145    | 150   | 165  | 460  |

| Source of variation | Sum of Squares | Degree of Freedom | Mean Squares | Computed Frequency |
|---------------------|----------------|-------------------|--------------|--------------------|
| Row means           | 1383           | 3                 | 461          | F1=2.82            |
| Column means        | 54             | 2                 | 27           | F2=.165            |
| Errors              | 980            | 6                 | 163          |                    |
| Total               | 2417           | 11                |              |                    |

Non-significant

Table 2: Variation of average monthly wood-waste fuel in summer and winter

| SUMMER | WINTER |
|--------|--------|
| X1     | X² 1   | X2    | X² 2 |
| 40     | 1600   | 80    | 6400 |
### Table 3: Variation of Fuel Wood Consumption in summer and Winter Seasons

|        | WINTE R  | SUMMER  |
|--------|----------|---------|
| X1     |           |         |
| 120    | 14400    | 256000  |
| 800    | 640000   | 3600000 |
| 240    | 576000   | 400000  |
| 600    | 360000   | 160000  |
| 80     | 6400     | 1600    |
| 240    | 56700    | 40000   |
| 400    | 160000   | 1600    |
| 120    | 14400    | 800     |
| 94     | 8836     | 6400    |
| 174    | 30276    | 120     |
| 147    | 21609    | 94      |
| 120    | 14400    | 800     |
| 120    | 14400    | 800     |
| 100    | 100000   | 100000  |
| 120    | 144000   | 6400    |

At 5% Significant

### Table 4: Variations in the kerosene Oil consumption in the summer and Winter

|        | SUMMER | WINTER |
|--------|--------|--------|
| X1     | X²     | X2     | X² |
| 20     | 400    | 25     | 625 |
| 20     | 400    | 25     | 625 |
| 10     | 100    | 15     | 225 |
| 10     | 100    | 15     | 225 |
| 2      | 4      | 4      | 16  |
| 1      | 1      | 2      | 4   |
| 1      | 1      | 2      | 4   |
| 2      | 4      | 4      | 16  |
| 10     | 100    | 15     | 225 |
| 10     | 100    | 15     | 225 |
| 10     | 100    | 15     | 225 |
| 60     | 3600   | 15     | 225 |
Table 5: Variations in the Wood waste consumption in the summer and Winter

|     | SUMMER |     | WINTER |     |
|-----|--------|-----|--------|-----|
|     | X1     | X² 1| X2     | X² 2|
| 40  | 1600   | 80  | 6400   |
| 40  | 1600   | 80  | 6400   |
| 40  | 1600   | 80  | 6400   |
| 80  | 6400   | 160 | 25600  |
| 80  | 6400   | 40  | 1600   |
| 40  | 1600   | 80  | 6400   |
| 80  | 6400   | 40  | 1600   |
| 40  | 1600   | 80  | 6400   |
| 94  | 8836   | 80  | 6400   |
| 174 | 30276  | 120 | 14400  |
| 147 | 21609  | 94  | 8836   |
| 120 | 14400  | 80  | 6400   |
| 120 | 14400  | 80  | 6400   |
| 100 | 10000  | 100 | 10000  |
| 120 | 14400  | 80  | 6400   |

At 5% Significant

Table 6: Variations in LPG consumption in the summer and Winter

|     | SUMMER |     | WINTER |     |
|-----|--------|-----|--------|-----|
|     | X1     | X² 1| X2     | X² 2|
| 20  | 400    | 800 | 6400   |
| 20  | 400    | 800 | 6400   |
| 10  | 100    | 2   | 4      |
| 10  | 100    | 2   | 4      |
| 2   | 4      | 2   | 4      |
| 1   | 1      | 4   | 16     |
| 2   | 4      | 15  | 225    |
| 10  | 100    | 15  | 225    |
| 10  | 100    | 15  | 225    |
| 60  | 3600   | 15  | 225    |
| 60  | 3600   | 15  | 225    |
| 60  | 3600   | 15  | 225    |
| 60  | 3600   | 15  | 225    |

At 5% Significant
Table 7: Variations in the Crop resi7dues consumption in the summer and Winter

|     | SUMMER |     | WINTER |     |
|-----|--------|-----|--------|-----|
| X1  | X² 1   | X2  | X² 2   |
| 120 | 14400  | 160 | 25600  |
| 120 | 14400  | 160 | 25600  |
| 40  | 1600   | 80  | 6400   |
| 400 | 160000 | 600 | 360000 |
| 80  | 6400   | 120 | 14400  |
| 20  | 400    | 2   | 4      |
| 80  | 6400   | 160 | 25600  |
| 10  | 100    | 20  | 400    |

At 5% Significant

Table 8: Variations in the Cow dung consumption in the summer and Winter

|     | SUMMER |     | WINTER |     |
|-----|--------|-----|--------|-----|
| X1  | X² 1   | X2  | X² 2   |
| 120 | 14400  | 160 | 25600  |
| 120 | 14400  | 160 | 25600  |
| 80  | 6400   | 160 | 25600  |
| 800 | 640000 | 1000| 100000 |
| 40  | 1600   | 80  | 6400   |
| 10  | 100    | 10  | 100    |
| 320 | 102400 | 640 | 409600 |
| 40  | 1600   | 80  | 6400   |
| 40  | 1600   | 80  | 6400   |
| 60  | 3600   | 80  | 6400   |
| 30  | 900    | 70  | 4900   |
| 80  | 6400   | 10  | 10000  |
| 40  | 1600   | 20  | 400    |
| 40  | 1600   | 80  | 6400   |
| 40  | 1600   | 80  | 6400   |
| 60  | 3600   | 80  | 6400   |
| 60  | 3600   | 80  | 6400   |

III. DISCUSSION

Species Used For Different Aliments

There are about 24 plant species, which are used for different ailments. Ak (calatropis procera) R. Br. is used against skin diseases, eczema, toothache, abdominal pain and asthma (jadhev, 2008a). Harmal (pognum hermella) is used as narcotic, emetic anodyne, hypnotic, anti-lice and fumigated by ladies during small-pox. Dried pulp of bitter fruit of Tumma (citrullus colocynthus) (L.) Shrad. is effective in constipation(Usmanghani, et al., 1997). Fruit of Thumma (citrullus colocynthus) (L.) is useful for the stomach ailments and immunity for Rani Khet diseases and has cold effects against sun-stroke (Heat).

Seeds of Khoob Kalan or chanakhla (sysimbrium irio) Crantz ex steud are used as treatment against Typhoid, small pox. Whole plant of Sonuf (Foeniculum vulgare)
Miller is used for digestion problems, gas troubles, female illness and nervous diseases.

Harni Ka Khaj (cistanche tubulose) Wight is effective in diarrhoea and cures sores (Baquar, 1989) and Jawah (carum coticum) Benth. is used as blood purifier. Whole plant of Boophali (corchorus aestuens) Linn. is used for stomach and liver heat. Whole plant of hamal (Pognum hernala) L. is used for the defect in the uterus.

Seeds of Bhakra (Tribulus caldenulensis) L. are used for gallbladder illness and kidney allergy. Whole plant of Boophali (corchorus aestuens) Linn. is used for maleness in man and leucorrhoea.

Leaves of Sumblu or norgundani (vitex negundo) Linn. are used for wounds, oraktsus, and rheumatic pain. Its stem is used for fever. Its juice is useful for gall bladder problems. Its root powder is used for menstrual disorder and restores fertility. If it is roasted seeds powder and wheat flour is useful for easy delivery.

Neelwat (Withania somnifera) L. is used as an antiinflammatory and sedative agent (Williamson et. al., 2009). Cooked leaves of Bathu (chenopodium album) L. are used for coronary troubles. Its leaf extract is useful for piles, cough and worms.

Plant decoction of drunk (Polygonum plebijum) R. Br. is used against colic complaints. Plant ash and oil is useful for Eczema. The root of this plant is used in bowel complaints and powdered herb is given in pneumonia (Trivedi, 2002). Leaf juice of Jau (Hordeum vulgare) Linn. are useful for cataract. Leaves of Jund (Prosopic cineraria) (L.) Druce is useful for leucorrhoea.

Leaf paste and decoction of Mako or Mirchibooti (solanum nigrum) L. is used against jaundice and in case of high fever, cough and liver diseases (Trivedi, 2002).

**Problems related to herbal medicines Business.**

1. Pure things are not available.
2. Wild plants are expensive.
3. Hard work and labour is required.
4. Most of area is cultivated.
5. Forests are less, so wild plants have reduced.
6. Wild plants have high prices.
7. People discuss more, the prices of medicines.
8. Pure medicines are not available.
9. Information about plants is negligible.
10. Herbal medicines are shelter-classics Govt. is not paying any attention.
11. Trained people are not enough.
12. Area is being populated.
13. People do not collect plants due to low prices.
14. They insist on purchasing low prices.

**People treated per day different places.**

- Mostly 10 people are treated per day at Adhi kot almost 80 persons are treated per day at Jamali Baluchan.
- Mostly 20 people are treated per day at Noor pur thal.
- About 50 people are treated per day at Peelewance and 20 people are treated at Quluanwala. All classes are treated. 15 people are treated per day. Mostly poor and middle class are treated daily at Biland.

**Suggestions to increase the cover of the area.**

1. Government should give permission for forest plantation by giving free nurseries.
2. Government should make contact with ther farmers.
3. No of tubewell have to increase.
4. Farmers should be provided with fir nurseries and plants from the Government nurseries.

**Discussion regarding Statistical Analysis and Ethnobotany**

A- **Variation in the prices of different fuels yielding species of Khushab District.**

Variation in the prices of different fuels yielding species of Khushab District was determined by analysis of variation (ANOVA). Prices vary from Rs.15 to Rs.165 treatments and replicates were made and then total was taken. Sum of square of treatment, sum of square of columns and sum of square of errors were calculated which were 2417, 1383, 54 and 980 respectively (table 15).

By using source of variation, sum of square, degree of freedom and mean square, row means, and errors was calculated. Frequency (f1+f2) was found to know the significance of data. f1 was 2.82 which was more than actual value i.e. f2 0.165. So it was found that the variations in prices of different species at that area were significant.

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