## Kala-azar Control Activities

### Background

Visceral Leishmaniasis (VL) also termed as Kala-azar (KA) was known to be endemic in southern terai of Nepal as postulated by an Indian scientist Raghavan in 1953. Chronologically enough information is not available for the past in Nepal. During the 1960's and 1970's VL ceased to be a public health problem which was mainly attributed to countrywide malaria eradication activities with DDT spraying. With the advancement of malaria eradication activities and improvement of malaria situation, insecticide spraying was reduced. After more than a decade of curtailment of insecticide spraying particularly in southern terai VL cases started reappearing and were first recorded in 1980 with the incidence rate of 1.5 per 100,000 populations and case fatality rate of 5.88 percent. The highest CFR was in 1982 and the highest case incidence was in 2003 (Figure 11 and Table 13).

**Table 13: Profile of Visceral Leishmaniasis in Nepal 1980 - 2006**

| Year | No. of Cases | Incidence/$10^5$ | No. of Death | CFR (%) |
|---|---|---|---|---|
| 1980 | 51 | 1.50 | 3 | 5.88 |
| 1981 | 133 | 3.95 | 1 | 0.75 |
| 1982 | 266 | 7.90 | 35 | 13.16 |
| 1983 | 60 | 1.78 | 4 | 6.67 |
| 1984 | 94 | 2.79 | 5 | 5.32 |
| 1985 | 95 | 2.65 | 0 | 0.00 |
| 1986 | 199 | 9.27 | 6 | 3.02 |
| 1987 | 169 | 6.48 | 8 | 4.73 |
| 1988 | 442 | 17.18 | 1 | 0.23 |
| 1989 | 291 | 9.01 | 5 | 1.72 |
| 1990 | 446 | 12.45 | 34 | 7.62 |
| 1991 | 870 | 17.45 | 56 | 6.44 |
| 1992 | 1395 | 20.96 | 8 | 0.57 |
| 1993 | 1368 | 34.08 | 5 | 0.37 |
| 1994 | 1976 | 49.03 | 9 | 0.46 |
| 1995 | 1787 | 44.60 | 65 | 3.63 |
| 1996 | 1571 | 39.14 | 55 | 3.50 |
| 1997 | 1342 | 33.23 | 36 | 2.68 |
| 1998 | 1409 | 33.88 | 42 | 2.98 |
| 1999 | 1794 | 43.14 | 24 | 1.34 |
| 2000 | 2090 | 50.26 | 50 | 2.39 |
| 2001 | 1736 | 41.75 | 17 | 0.98 |
| 2002 | 2029 | 48.76 | 14 | 0.59 |
| 2003 | 2229 | 53.61 | 32 | 1.44 |
| 2004 | 1588 | 37.88 | 32 | 2.02 |
| 2005 | 1463 | 34.83 | 21 | 1.44 |
| 2006 | 1531 | 36.81 | 14 | 0.91 |
| | **28424** | | **582** | **2.05** |

VL is mainly confined to the southern plains of Eastern and Central regions bordering VL endemic districts of Bihar State of India. However, a few sporadic cases are occasionally recorded from other parts of the country. Approximately 6.5 million populations are estimated to be at risk of Kala-azar. A total of 28,424 cases with 582 deaths were reported during 1980 - 2006 and the Case Fatality Rate (CFR) varied from 0.23 to 13.16 (Table 13 Figure 11).

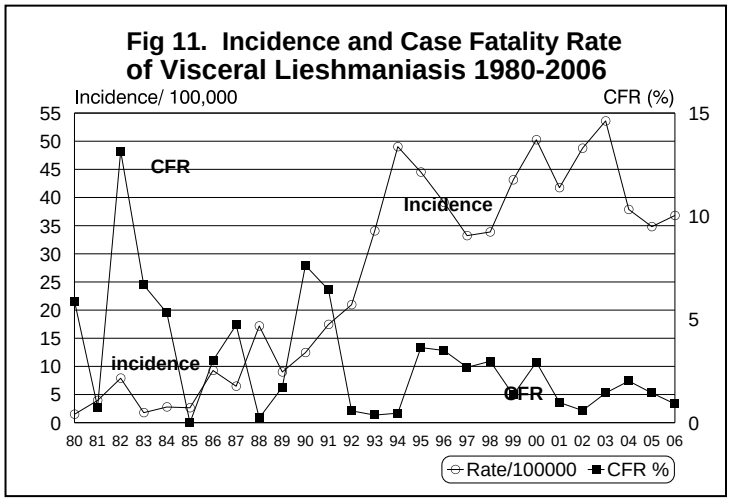



**Fig 11. Incidence and Case Fatality Rate of Visceral Lieshmaniasis 1980-2006**

The figures given do not represent the actual VL situation of the country as these VL cases are reported from the hospital records (mainly government) and patients treated elsewhere are not included. Therefore it is believed that VL in Nepal is a grossly under reported disease. The VL cases are diagnosed on the basis of clinical signs and symptoms supported by aldehyde bone marrow tests in the hospitals. During the year 2002 and 2006 many cases were diagnosed with dip-stick test. Study on vector(s) of kala-azar has been limited in Nepal. However, in 1992 *Ph. argentipes* was incriminated as vector of VL in the southern plains of central Nepal (Dhanusha). As *Ph. papatasi* is strongly anthropophilic species should not be ruled out as potential vector of Kala-azar.

Passive case detection mechanism is the method for the detection of VL cases. Only those cases are recorded who present themselves to the hospitals or sometimes to private clinics, so that the actual prevalence rates are difficult to estimate. VL cases are diagnosed and treated in the hospitals by the first line drug sodium antimony gluconate and cases not responding well to the above drug should be treated with amphotericin 'B' under medical supervision following the national drug policy. The limited surveillance mechanism jeopardises the management of control operations of VL. However, indoors residual insecticide spraying (IRS) was started in 1992 for Kala-azar control with the insecticide synthetic pyrethroids. As per national IRS policy only those villages are sprayed, where VL cases were recorded in previous years. In 2004, 489,499 population in round I and 461,739 in round II were protected. Similarly in 2005 in round I 630,460 populations and in round II 731,933 population were protected by indoor residual spraying. Also in 2006 in round I 503,994 and in round II 382,252 population were protected in the high endemic areas.

**Objectives of KA control:**

- Reduction of morbidity and mortality due to Kala-azar,
- Prevention and control of outbreaks / epidemics
- Introduction of $rK_{39}$ for diagnosis and oral Miltefosine for treatment following kala-azar elimination strategy.

**Approaches**

- Training of health personnel to develop and strengthen referral system of clinically suspected Kala-azar cases from SHP/HP to PHC, district hospitals and higher level institutions.
- Establishing and strengthening diagnostic facility, training of Medical Officers/ Physicians on diagnosis and management of kala-azar cases.
- Follow-up of Private health institutions and practitioners.
- Active surveys to detect cases.
- Promote Information Education & Communication (IEC) activities in Kala-azar endemic districts.

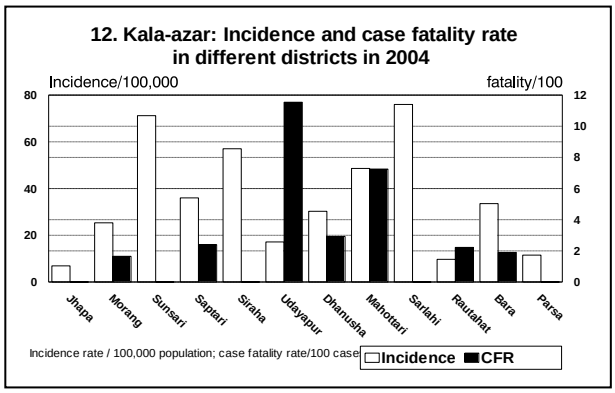
**Situation Analysis**

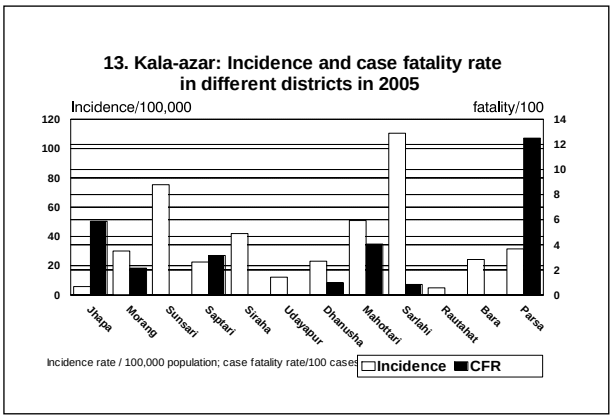
From 1980 to 1989 the incidence rate per 100,000 populations remained below 10 except in 1988 when the incidence rate was 17.18. The minimum incidence rate was 1.50 in 1980. The case fatality rate was 0 in 1985 and is as high as 13.16% in 1982. After 1989 the incidence rate remained quite high and reached up to 20 in 1992. From 1993 onward it was always above 33

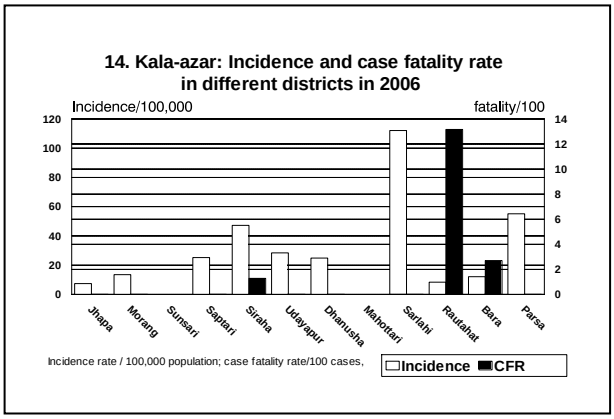
and up to 54 in the year 2003, however, case fatality rate fluctuated between 3.63 in 1995 to 0.37 in 1993. Higher case incidence rate lower case fatality rate during the later part of the last decade indicates probably to the prompt and regular reporting of KA cases and also to the betterment of treatment of the cases at the hospitals (Table 13).

**Present Situation**

In 2004, 2005 and 2006 altogether 1588, 1463 and 1066 respectively cases were recorded in the country from 12 districts/hospitals. One case was recorded from Okhaldhunga and 2 cases from Makwanpur district in 2005 with no death.




District-wise analysis of data revealed that in 2004 the highest KA incidence (KAI) was in Sarlahi district (76/100,000). Two other districts that showed incidence rate higher than 50/100,000, were Sunsari, and Saptari. The remaining 8 districts showed the incidence less than 50/100,000 population. Out of those 12 districts, 3 districts showed no death due to KA. The highest CFR was in Udayapur (11.54%) followed by Mahottari (7.25%), Dhanusha (2.92%), Saptari (2.4%) and Rautahat (2.22%). In rest of the districts the CFR was low (below 2%) (Figure 12, Table 14, Annex G).

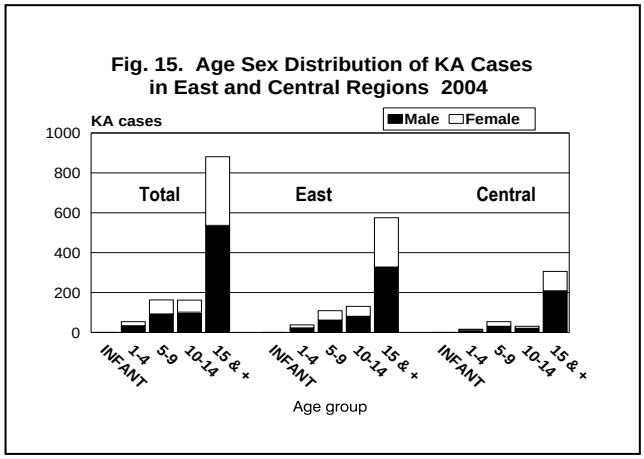
In 2005, the highest KAI was in Sarlahi (110/100,000 Population). The other districts that showed KAI higher than 50 were Sunsari and Mahottari. The remaining 9 districts showed KAI lower than 31/100,000 population and the lowest was in Rautahat (4.86/100,000). The CFR was highest in Parsa (12.5) followed by Jhapa (5.9%) and Mahottari (4.9%). The other districts have CFR around and less than 2 %. 5 districts showed no death due to KA (Figure 13, Table 14, Annex G)

In 2006 the highest KAI again was Sarlahi (112.08/100,000) and followed by Parsa (55.1/ 100,000) and Siraha (47.2/100,000). CFR was highest in Rautahat. The other 2 districts that showed death due to KA, were Siraha (CFR 1.28%) and Bara (CFR 2.70) (Figure 14, Table 14, Annex G).

**Table 14: District & Region-wise KA Cases, Deaths 2004 –2006**

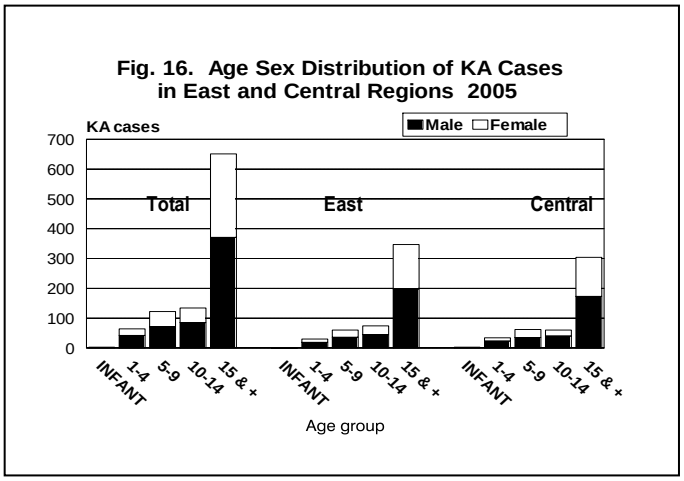
| Districts | Population | Year | Cases | Incidence* | Death | CFR% |
|---|---|---|---|---|---|---|
| **Jhapa** | 303883 | 2004 | 21 | 6.91 | 0 | 0.00 |
| | | 2005 | 17 | 5.73 | 1 | 5.88 |
| | | 2006 | 22 | 7.42 | 0 | 0.00 |
| **Morang** | 477446 | 2004 | 121 | 25.34 | 2 | 1.65 |
| | | 2005 | 140 | 30.06 | 3 | 2.14 |
| | | 2006 | 63 | 13.53 | 0 | 0.00 |
| **Sunsari** | 257083 | 2004 | 183 | 71.18 | 0 | 0.00 |
| | | 2005 | 189 | 75.35 | 0 | 0.00 |
| | | 2006 | 117 | 46.65 | 2 | 1.71 |
| **Saptari** | 577891 | 2004 | 291 | 35.99 | 0 | 0.00 |
| | | 2005 | 209 | 22.53 | 0 | 0.00 |
| | | 2006 | 255 | 51.22 | 5 | 1.96 |
| **Siraha** | 510261 | 2004 | 208 | 57.03 | 5 | 2.40 |
| | | 2005 | 127 | 41.98 | 4 | 3.15 |
| | | 2006 | 142 | 47.21 | 0 | 0.00 |
| **Udayapur** | 151495 | 2004 | 26 | 17.16 | 3 | 11.54 |
| | | 2005 | 18 | 12.18 | 0 | 0.00 |
| | | 2006 | 42 | 28.42 | 0 | 0.00 |
| **Okhaldhunga** | | | 1 | | 0 | 0.00 |
| **ER Total** | | 2004 | 850 | | 10 | 1.17 |
| | | 2005 | 701 | | 8 | 1.14 |
| | | 2006 | 641 | | 7 | 1.09 |
| **Dhanusha** | 452731 | 2004 | 137 | 30.26 | 4 | 2.92 |
| | | 2005 | 102 | 23.09 | 1 | 0.98 |
| | | 2006 | 109 | 24.68 | 0 | 0.00 |
| **Mahottari** | 397044 | 2004 | 193 | 48.61 | 14 | 7.25 |
| | | 2005 | 197 | 50.86 | 8 | 4.06 |
| | | 2006 | 328 | 84.68 | 1 | 1.96 |
| **Sarlahi** | 332950 | 2004 | 253 | 75.99 | 1 | 0.40 |
| | | 2005 | 359 | 110.52 | 3 | 0.84 |
| | | 2006 | 364 | 112.06 | 0 | 0.00 |
| **Rautahat** | 463615 | 2004 | 45 | 9.71 | 1 | 2.22 |
| | | 2005 | 22 | 4.86 | 0 | 0.00 |
| | | 2006 | 38 | 8.40 | 5 | 2.70 |
| **Bara** | 312915 | 2004 | 105 | 33.56 | 2 | 1.90 |
| | | 2005 | 74 | 24.24 | 0 | 0.00 |
| | | 2006 | 37 | 12.12 | 1 | 2.70 |
| **Parsa** | 26035 | 2004 | 3 | 11.52 | 0 | 0.00 |
| | | 2005 | 8 | 31.5 | 1 | 12.50 |
| | | 2006 | 14 | 55.12 | 0 | 0.00 |
| **Makwanpur** | | 2005 | 2 | | 0 | 0.00 |
| **CR Total** | | 2004 | 736 | | 22 | 2.99 |
| | | 2005 | 764 | | 13 | 1.70 |
| | | 2006 | 890 | | 7 | 0.78 |
| **National** | | 2004 | 1588 | | 32 | 2.01 |
| | | 2005 | 1463 | | 21 | 1.43 |
| | | 2006 | 1531 | | 14 | 0.91 |
| * Incidence per 100,000 population | | | | | | |

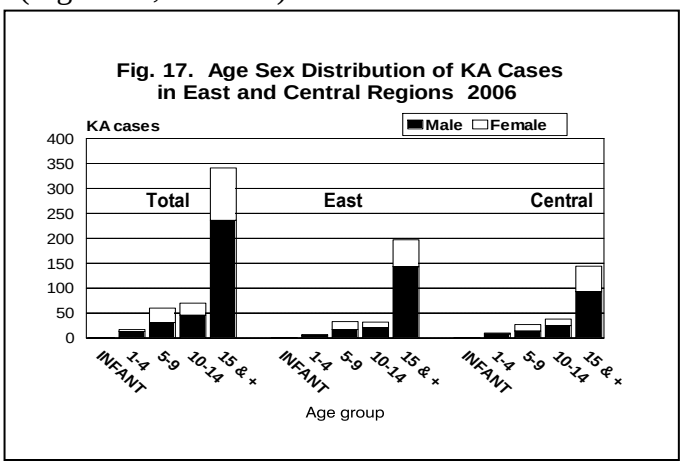
## Age Sex Distribution of KA cases




Age group-wise distribution of 1260 KA cases during 2004 showed 0% among infants, 4.29% among 1-4 years, 12.9% among 5-9 years, 12.9% among 10-14 years and 69.9% among 15 years and above age groups. Sex-wise distribution showed predominance of male with male to female ratio of 1:0.59 among 1-4 years, 1:0.75 among 5- 9 years, 1:0.59 among 10-14 years and 1:0.75 among 15 years and above age groups. Region wise age sex distribution showed similar pattern (Figure 15, annex H).

Age group-wise distribution of 973 KA cases during 2005 showed 0.20% among infants, 6.58% among 1-4 years, 12.5% among 5-9 years, 13.8% among 10-14 years and 67% among 15 years and above age groups. Sex-wise distribution showed male predominance with male to female ratio of 2:0 among infants, 1:0.52 among 1-4 years, 1:0.72 among 5- 9 years, 1:0.58 among 10-14 years and 1:0.75 among 15 years and above age groups. Region wise age sex distribution showed similar pattern (Figure 16, annex H).

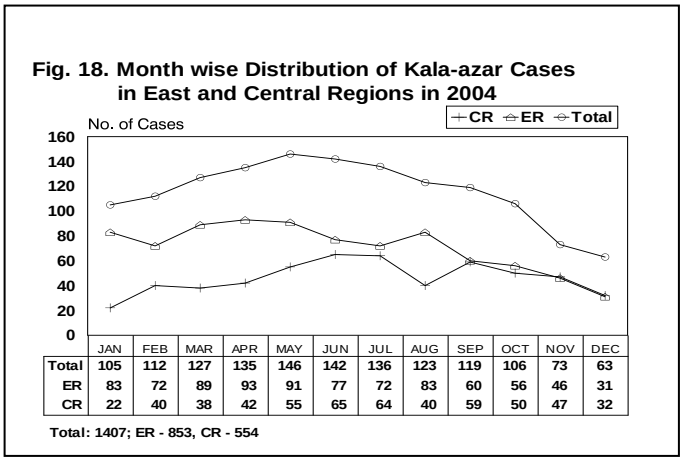



Age group-wise distribution of 488 KA cases during 2006 showed 0% in infants, 3.48% in 1-4 years, 12.3% in 5-9 years, 14.34% in 10-14 years and 69.88% in 15 years and above age groups. Sex wise distribution showed male predominance with male to female ratio of 1:0.31 in 1-4 years, 1:0.94 in 5-9 years, 1:0.52 in 10-14 years and 1:0.4 in 15 years and above age groups. Regional age sex ratios showed difference in adult groups - 1:0.38 in East and 1:0.55 in central (Figure 17 annex H).

## Seasonality of KA cases

Out of 1488, 1463 and 1531 KA cases reported in 2004, 2005 and 2006 respectively, only 1407, 1170, and 956 are available with month wise distribution. The reporting of KA cases showed the peak in May during 2004, and April in 2005 and 2006. In all three years reporting of cases started in January with a slight increase above the average of the year. Peak was

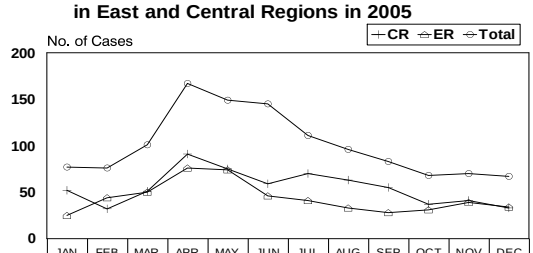



| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total | 105 | 112 | 127 | 135 | 146 | 142 | 136 | 123 | 119 | 106 | 73 | 63 |
| ER | 83 | 72 | 89 | 93 | 91 | 77 | 72 | 83 | 60 | 56 | 46 | 31 |
| CR | 22 | 40 | 38 | 42 | 55 | 65 | 64 | 40 | 59 | 50 | 47 | 32 |

Total: 1407; ER - 853, CR - 554

around 150% of the average. During October to December the cases reported were always slightly above the average (Figure 18-20, annex I).

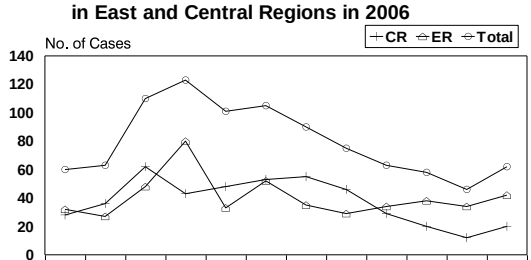
**Fig. 19. Month wise Distribution of Kala-azar Cases in East and Central Regions in 2005**




| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total | 77 | 76 | 101 | 167 | 149 | 145 | 111 | 96 | 83 | 68 | 70 | 67 |
| ER | 25 | 44 | 50 | 76 | 74 | 46 | 41 | 33 | 28 | 31 | 39 | 34 |
| CR | 52 | 32 | 51 | 91 | 75 | 59 | 70 | 63 | 55 | 37 | 41 | 33 |

Total: 1170; ER - 511, CR - 659

**Fig. 20. Month wise Distribution of Kala-azar Cases in East and Central Regions in 2006**




| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total | 60 | 63 | 110 | 123 | 101 | 105 | 90 | 75 | 63 | 58 | 46 | 62 |
| ER | 32 | 27 | 48 | 80 | 33 | 52 | 35 | 29 | 34 | 38 | 34 | 42 |
| CR | 28 | 36 | 62 | 43 | 48 | 53 | 55 | 46 | 29 | 20 | 12 | 20 |

Total: 956; ER - 504, CR - 452

## Indoor Residual Spraying (IRS)

During 2004, altogether 110,113 households with 489,499 population in summer and 98,587 households with 461,739 populations in autumn cycle were protected by IRS. The insecticide alpha-cypermethrine was used in all the districts except Bara where K-Othrine was used. The per HH and per capita expenditure of insecticide were 66.1 gms and 14.9gms respectively in summer cycle, and 67.8 and 14.5 gms respectively in Autumn cycle

During 2005, altogether 171,948 households with 705,966 population in summer and 102,483 households with 481,180 populations in autumn cycle were protected by IRS. The insecticide alpha-cypermethrin was used in all districts except Bara where the insecticide was not mentioned. The per HH and per capita expenditure of insecticide were 62.3gms and 15.2gms respectively in summer cycle, and 69.6 and 14.8 gms respectively in autumn cycle.

During 2006, altogether 77,599 households with 503,994 population in summer and 148112 households with 382,242 population in autumn cycle were protected by IRS. The insecticide alpha-cypermethrin was used in all the districts. The per HH and per capita expenditure of insecticide were 75.9gms and 14.6gms respectively in summer cycle, and 42.4 and 19.1 gms respectively in autumn cycle.

## Activities of Vector Borne Disease Research and Training Centre, Hetauda

### *Diagnostic Services*

An equipped laboratory for diagnosis of JE and Kala-azar (KA) was established with the assistance of EHP/USAID Nepal. Two Laboratory personnel were trained on serological diagnosis of JE and KA and are conducting IgM capture ELISA technique and Direct Agglutination Test (DAT) for the diagnosis of JE and KA respectively. The Centre is providing regularly the diagnosis services to the patients referred from different health institutions. For diagnosis of malaria, examination of thick smear and thin smear is available. The IgM capture ELISA and HI test for the diagnosis of Japanese Encephalitis is being standardized in collaboration with experts from Thailand. For diagnosis of Kala-azar, DAT and K-39 dipstick tests are available.

During the years 2004, 2005 and 2006 training for Masters Trainers for Jhapa, Morang, Dhanusha, Bardia, Kailali and Kanchanpur districts were undertaken. Also basic and refresher training on malaria microscopy for district laboratory staff were organized during the years.