average number of people per house. It may be noted that a similar "risk of infection index", but based on the incidence of infective mosquitos caught biting, has recently been proposed. The need for a fresh quantitative approach to the interacting entomological variables that play a part in determining the malaria inoculation rate became evident in the years immediately following the widespread introduction of DDT.

Boyd (1949) pointed out that malariologists had largely ignored Ross (Ross, 1911) mathematical expression of the various factors involved in the perpetuation of a malaria situation; and in concluding his full review of the entomological factors (pp. 608-697) he wrote:" It is to be regretted that even now quantitative values for Ross's factors are lacking. Observed data enable us to assign values to many of the factors on the human side of the equation, but not those pertaining to the vector. "

Another landmark was the concept of vectorial capacity (Garrett-Jones, 1964a) which is density-dependent, the parameter of density to be measured is the man-biting rate ("ma") with the issue of sampling (Service, 1970; Service, 1977), the longevity ("p") of vectors involved (Detinova, 1962) and the length of the sporogonic development of the *Plasmodium* species involved ("n"), but not the infectivity "s" (with the issues of ELISA versus salivary glands classical examination) (Fontenille *et al.,* 2001; Bassene *et al.*, 2009).

The changes of vectorial capacity induced by vector control operations targeting adults' vectors was largely used. DDT house spraying in Northern Nigeria "reduced the malaria vectorial capacity of *Anopheles gambiae* sp B (the main vector of *Plasmodium falciparum* in the area) by an over-all factor of about 23 times." (Garrett-Jones and Shidrawi, 1969). Vectorial capacity was also used to evaluate the impact of inside residual spraying with propoxur during three years (with one year as control) during the Garki Project (N Nigeria) and the mathematical model developed from data obtained (Dietz *et al.*, 1974; Molineaux *et al.*, 1978). Evolution of vectorial capacity was also evaluated with data collected in Kisumu (Kenya) over a period of three years including 20 months during which the insides of houses were sprayed with fenitrothion (Molineaux *et al.*, 1978).

The Balombo Project adopted the same protocol as Garki project with two years control and three years following vector control implementation. The entomological inoculation rate (EIR) is easier to evaluate as involving only two parameters: biting rate ('ma") and infectivity (s) and was largely used recently (Hay *et al.*, 2000; Elissa *et al.,* 2003; Kelly-Hope and McKenzie, 2009; Mboera *et al.*, 2010; Shaukat *et al.*, 2010; Das *et al.,* 2017; Amoah *et al.*, 2021; Doumbe-Belisse *et al.*, 2021; Ukawuba and Shaman, 2022; Degefa *et al.*, 2024).

But as presented, the EIR, such as vectorial capacity, seems to increase as a linear function of time while in the Birley's formula the risk is log function of density, infectivity *and times of exposure*. This is well in line with the analysis of "31 sites throughout Africa to establish fundamental relationship between annual EIRs and the prevalence of *Plasmodium falciparum* malaria infection. The majority of sites fitted a linear relationship (r^2= 0.71) between malaria prevalence and the logarithm of the annual EIR" (Beier *et al.*, 1999). It was considered that" the analysis also highlights that the EIR is a more direct measure of transmission intensity than traditional measures of malaria prevalence or hospital-based measures of infection or disease incidence. Therefore, malaria field programs need to consider both entomologic and clinical assessments of the efficacy of transmission control measures." This approach was actually implemented in the Balombo project with parasitological surveys systematically done two weeks after each entomological survey (Carnevale *et al.*, 2024) such as the protocol already implemented in Northern Cote d'Ivoire to evaluate the efficacy of lambda cyhalothrin treated nets in an area where the main vector, *Anopheles gambiae* has a kdr based resistance to pyrethroid (Henry *et al.*, 2005).

Such comprehensive approach was already carried out, in Burkina Faso, several decades ago, to evaluate the efficacy of house spraying in the Pilot zone of Bobo-Dioulasso (Hamon *et al.*, 1959); and, more recently, in Peru where parasitological observations were made along with entomological one for an epidemiological evaluation of vector control (Rosas-Aguirre *et al.*, 2021).

The village scale Balombo vector control project was planned to follow the simultaneous changes of entomological and parasitological index during five years, then parasitological surveys were done for six years