Bird-keeping in Indonesia: conservation impacts and the potential for substitution-based conservation responses

Paul Jepson and Richard J. Ladle

Abstract Bird-keeping is an extremely popular pastime in Indonesia, where there is a thriving internal market in both wild-caught and captive-bred birds. However, little is known about whether the scale of bird-keeping represents a genuine conservation threat to native populations. Here we present the results of the largest ever survey of bird-keeping among households in Indonesia's five major cities. Birds were found to be urban Indonesia's most popular pet (kept by 21.8% of survey households) and we conservatively estimate that as many as 2.6 million birds are kept in the five cities sampled. Of bird-keeping households, 78.5% kept domestic species and/or commercially bred species and 60.2% kept wild-caught birds that we classified into three conservation categories: native songbirds, native parrots and imported songbirds. Compared to non-bird owners, households keeping wild-caught birds in all three conservation categories were richer and better educated, whereas households owning commercially-bred species were richer but not better educated and households keeping domestic species did not differ in educational or socio-economic status. We conclude that bird-keeping in Indonesia is at a scale that warrants a conservation intervention and that promoting commercially-bred alternatives may be an effective and popular solution.

Keywords Birds, bird trade, CITES, culture, Indonesia, market-led conservation.

Introduction

The international conservation movement is unified in the belief that human use and trade of wildlife should not endanger wild populations. This principle found widespread support among governments of the community of nations and is the basis of the 1973 Convention on Trade in Endangered Species (CITES Secretariat, 2000). This convention promotes legal and regulatory mechanisms as the means to put this principle into practice. A central feature of the treaty is three lists of species at risk from trade (Appendices I–III), which establish increasingly stringent international trade restrictions on the species concerned. In many less-developed countries assuring CITES compliance is the primary driver of national level policy meetings on wildlife trade. Consequently CITES regulatory discourse tends to dominate the thinking of local policy makers and frame how they conceptualize responses to both international and domestic wildlife trade (Reeve, 2002). To avoid perpetuating the misconception that trade (regulatory) measures alone constitute an effective policy response when a species is threatened by trade (Dickson, 2003), we suggest that more debate is needed on the efficacy of market-led approaches in less-developed countries.

Two such market-led approaches gaining widespread acceptance are sustainable offtake and substitution, either with cultivated or farmed wild species or alternative products. These measures have been applied to major extraction industries such as forestry (timber, non-timber forest products; Shanley *et al.*, 2002), fisheries (MSC, 2002), 'collectables', notably orchids (Orlean, 2000), medicinal plants (Schippman *et al.*, 2002) and the aquarium-fish sector (Wabnitz *et al.*, 2003). They incorporate the recognition that for some commodity chains it is impractical and/or undesirable on social, cultural and economic grounds to ban trade and consumption of natural products. In addition they reflect the rise of 'sustainability' in international policy discourse (Princen & Finger, 1994) and the idea of ethical or 'green' consumerism that posits that supply chains can be changed by empowering consumers to make informed and ethical decisions over which products or brands they purchase.

Capture for the pet trade is the primary threat category for 34 bird species in Asia and is a major problem for several threatened birds in Indonesia (BirdLife International, 2003). Bird-keeping is a popular pastime in Indonesia, with deep cultural roots. It is widely assumed that the hobby negatively affects wild populations of common as well as threatened birds (Nash, 1994) and that government capacity and will to implement wildlife regulations in Indonesia is limited (Reeve, 2002).

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Here we consider three questions. Firstly, is bird-keeping in Indonesia at a scale where it constitutes a conservation issue? Secondly, is substitution already occurring and at what level? Thirdly, is the profile of Indonesian bird-keepers compatible with a successful substitution mechanism (i.e. promoting commercially-bred alternatives)? We argue that complementary approaches to regulation are needed where bird-keeping has deep cultural roots, and that substitution is more likely to succeed in situations where a degree of commercial breeding already exists, where commercial breeding produces birds cheaper or of better quality compared to catching from the wild, and where the hobbyists are from social strata that can be targeted by ethical consumerist propaganda. To investigate these questions and propositions we conducted an exploratory survey of bird-keeping in Indonesia's five major cities.

Methods

The present survey was piggy-backed on the March 1999 biannual Omnibus™ household survey conducted by the consumer survey company A.C. Nielsen. This survey samples a population of 1,740 randomly selected households in Jakarta, Surabaya, Medan, Bandung and Semarang (Fig. 1). These are Indonesia's five most populous cities and together support a population of *c*. 20 million people (one third of the urban population of west Indonesia) residing in an estimated 4,342,000 houseoulds (A.C. Nielsen, own data). The survey protocol involves a face-to-face questionnaire interview with the person responsible for choosing the household's needs, and covers a variety of topics of interest to retail companies. Socio-economic attributes are collected on each respondent such as, age, education and monthly household income (grouped in five bands). Within this regular survey we inserted a set of questions relating to bird-keeping.

Respondents were first asked whether or not they kept a pet. Those who responded that they kept a bird were asked four supplementary questions: (1) What birds do you keep? (2) How many birds do you keep? (3) How long do the birds live? (4) Where do you obtain your birds? Because of the short time available for this topic within the overall interview, respondents were given pre-defined response categories for questions 1 and 4 with the opportunity to define 'others'.

The predefined response categories related to five bird groups and species of particular interest for conservation planning at the time, namely: (1) spotted dove *Streptopelia chinensis* and zebra dove *Geopelia striata*, which are popular pets and are commercially bred; (2) laughing-thrushes *Garrulax* spp., of which several species are imported from China, Indochina and South-east Asia; (3) parrots, which mostly originate in eastern Indonesia and of which several species are kept; (4) hill myna *Gracula religiosa*, which was proposed for inclusion on CITES appendix II at the time of this survey

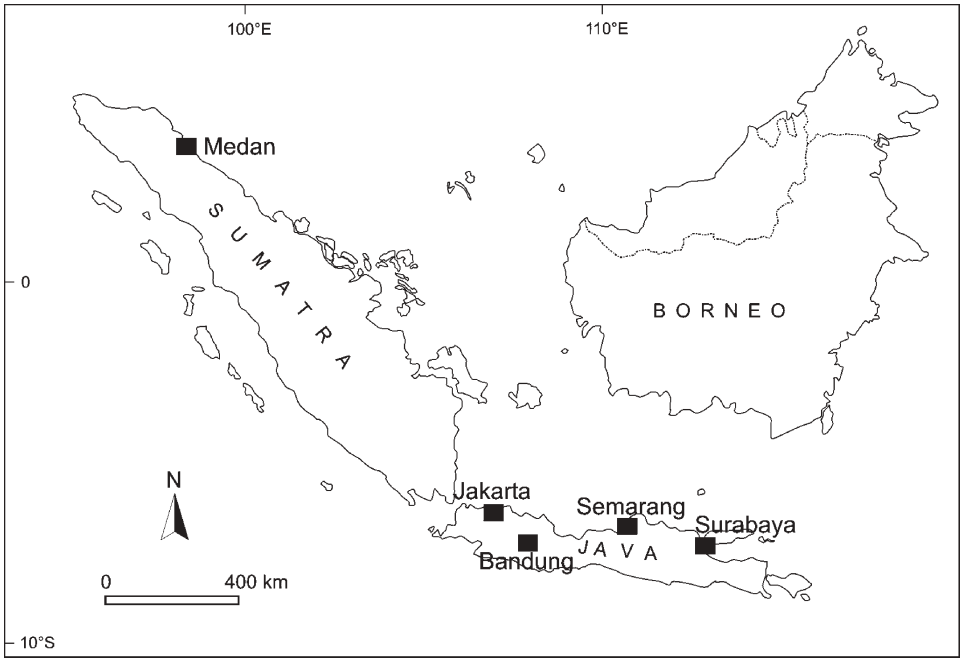

Fig. 1 Map of West Indonesia with locations of the five cities surveyed.

(1998); and (5) straw-headed bulbul *Pycnonotus eylanicus*, which is close to extinction in the wild (BirdLife International, 2001). Respondents were asked for the names of any birds kept that they considered did not fit into one of these groups.

For the purpose of analysis, data was consolidated into five conservation impact categories: (1) domestic species, (2) commercially-bred native species, (3) wild-caught native songbirds, (4) wild-caught native parrots, (5) wild-caught imported songbirds (Appendix 1). Birds kept in categories 1 and 2 are of limited conservation concern, whereas keeping birds in categories 3–5 may result in negative conservation impacts. Allocation of respondent answers to each of these categories was reviewed by an independent expert on Indonesian bird-keeping and bird names (S. van Balen). In this survey chicken was treated as a category of pet different to a bird, in accordance with the folk taxonomy followed by many Indonesians who lack a biological training.

We generated an estimate of the total number of birds kept in each category by multiplying the number of households keeping a bird by the average number of birds kept. To generate an estimate of the number of birds acquired per year we first converted the response categories on length of time a bird was kept to an acquisition rate (i.e. a check in the 1–3 month category equates to 1 bird acquired per 3-month period, a check in the 3–6 month category equates to 0.5 birds acquired in a 3-month period, and so on), and then multiplied the mean acquisition rate for a category by the estimated number of birds kept.

Results

This survey found that birds are the most popular household pet in the sample population. In the five major cities, 21.8% (380/1,740) of households surveyed kept a bird, compared with 16.6% (289/1,740) keeping a chicken, 9.5% (165/1,740) a fish, 3.4% (9/1,740) a cat, and 2.7% (47/1,740) a dog. The frequency of bird ownership extrapolates to an indicative total of 1,261,600 households keeping a bird. The indicative number of birds kept in five conservation categories is 2,823,740 and the estimated number of birds acquired per year is 2,457,760. The incidence of keeping of hill myna and straw-headed bulbul, which were species of particular conservation interest at the time of the survey, was low (n = 8 and 15, respectively). Domestic and commercially-bred species account for 65.8% of the total (Table 1).

There were significant differences in the proportion of the sample population keeping birds in different cities ($\chi^2 = 69.358$, n = 1,360, df = 4, $P < 0.001$). In Jakarta (16.7%) and Medan (10.5%) the proportion of households is lower than predicted, whereas in Semarang (34.4%) and Surabaya (29.5%) it is higher than expected. The average number of birds owned also differed significantly between cities ($F_{4,1735} = 18.459$, $P < 0.001$; Fig. 2) with Semarang (0.472 birds per person) the highest and Medan (0.1334) the lowest. Tukey-Kramer post-hoc tests revealed that Semarang and Surabaya have significantly more birds per household than Medan, Bandung and Jakarta (Fig. 2).

Respondents named 38 species or species groups as being kept in addition to the five predefined response categories (Appendix 1). Species in the two categories of least conservation concern were owned by 78.4% (298/380) of households keeping birds, whereas 60.2% (229/380) kept a species in the three categories of conservation concern (i.e. wild-caught). Native song-birds were by far the most popular category kept (86.8%, 330/380 of households keeping a bird) and the proportion classed as commercially-bred slightly exceeds that classed as wild-caught (44.5% vs 42.3%) (Table 1).

Table 1 Indicative number of birds kept and acquired in Indonesia's five major cities according to five groupings of conservation concern.

	n	Households (,000)	No. kept (mean ± SE)	No. in captivity	Mean accumulation rate (years) ± SE	Indicative no. of birds acquired per year
Domestic species	129	299	3.12 ± 0.14	933,750	1.01 ± 0.11	943,090
Commercially-bred native species	169	392	2.36 ± 0.20	925,310	0.80 ± 0.80	740,250
Wild-caught native songbirds	161	372.5	2.03 ± 0.14	758,250	0.81 ± 0.81	614,180
Wild-caught native parrots	22	51	1.18 ± 0.11	60,230	0.84 ± 0.84	50,590
Wild-caught imported songbirds	46	106.75	1.37 ± 0.10	146,210	0.75 ± 0.75	109,650
Total				2,823,740		2,457,760

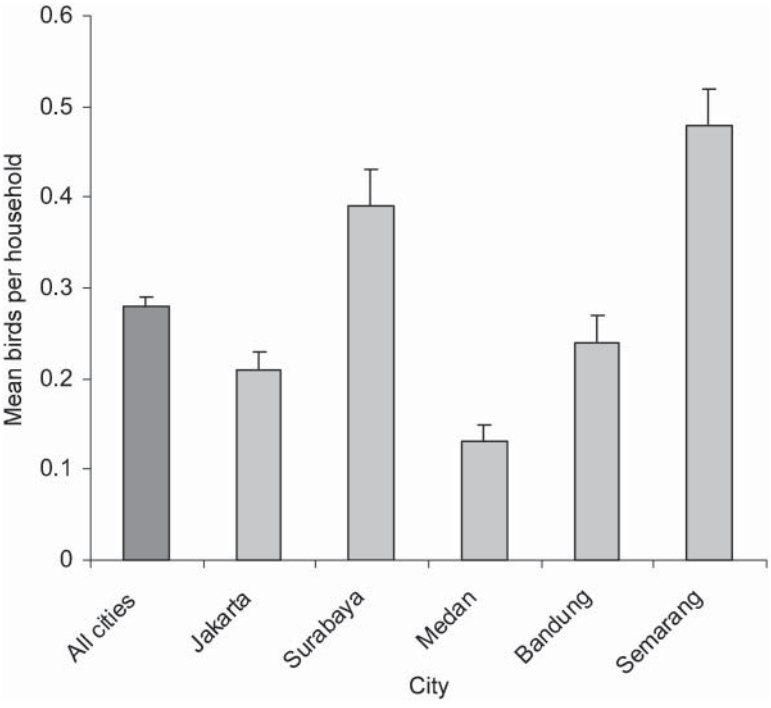

Fig. 2 Mean numbers (± SE) of birds kept by households in Indonesia's five largest cities.

Non-parametric bivariate analysis revealed consistent patterns in respondents' socio-economic status, education, age group and bird ownership. Overall, households keeping birds had a higher household income and educational attainment but age group was not significantly different. Specifically, households owning a bird in the three conservation concern categories were richer and better educated, whereas households owning commercial-bred species were richer but not better educated, and households keeping domestic species did not differ from households not keeping birds (Table 2).

In the sample surveyed 56.1% (193/380) of respondents said they obtained their birds from a bird market or door-to-door seller (who work on behalf of market traders), 46.8% (178/380) from a friend or relative and 10% (38/380) said they caught their birds. We found no significant difference in the relative proportions of respondents obtaining their birds in these ways between the cities. However, analysis of the socio-economic attributes revealed that richer and more educated households buy from markets or door-to-door sellers, whereas poorer, less-well educated households are more likely to

Table 2 Results of bivariate analysis (Mann Whitney U tests) of socio-economic status (SES), educational background category and age group for the five conservation impact categories (see text for details).

			SES		Education		Age group	
Bird Category	N_1	N_2	*U*	P	*U*	P	*U*	P
Domestic species	1,611	129	98351	.282	940485.5	.066	94037	.069
Commercially-bred native species	1,571	169	113220.5	.001*	124308.5	.165	129234.5	.567
Wild-caught native songbirds	1,579	161	89838.5	<.001*	106060.5	<.001*	122436.5	.437
Wild-caught native parrots	1,718	22	10712	<.001*	11999	.003*	14625	.065
Wild-caught imported songbirds	1,694	46	23568	<.001*	27378.5	<.001*	37061	.568

N_1, does not own a bird in that category
N_2, owns a bird in that category
* statistically significant result

catch their birds. There were no significant differences between socio-economic attributes of households that did or did not obtain their bird as a gift or from a friend (Table 2).

Discussion

This survey constitutes the first empirical profile of the bird-keeping hobby in Indonesia. Considering that the five cities sampled in this survey account for just a quarter of Indonesia's 80 million urban population, four important general conclusions can be drawn: (1) bird-keeping is a very popular hobby and retains a central place in the urban culture of modern Indonesia; (2) large numbers of birds are kept and acquired each year; (3) wild-caught birds account for about one third of birds kept and acquired; (4) bird ownership is generally associated with richer and better educated households.

The survey findings confirm the cultural significance of bird-keeping in Indonesia. In traditional Javanese culture a bird in a cage symbolizes the importance of a hobby in a balanced life and the symbolic species is generally considered a dove, either the zebra dove or the spotted dove (H.M. Kamil Osemann, pers. comm.). We found that these two species, which constitute our commercially-bred native species category, are kept by 56% of households keeping a bird.

Our finding that bird-keeping is most popular in Semarang is consistent with the thesis that bird-keeping is part of the Javan cultural identity. Semarang is located in central Java, considered to be the cultural heartland of the Javanese as it is the site of the ancient Majaphit kingdom and the cultural cities of Solo and Yogyakarta. However, it is also important to note that Semarang has the highest proportion of ethnic Chinese of any city in Indonesia, and Surabaya (the second ranking city for popularity of bird-keeping) also has a large ethnic Chinese population (Oey, 1997). Bird-keeping is a traditional pastime in China and the combination of proximity to central Java and large populations of ethnic Chinese probably explains the higher than expected incidence of bird-keeping in these two cities. Conservation approaches that maintain and strengthen cultural practices are more likely to succeed. The Javanese and Chinese ethnicities are economically and politically the two most powerful groups in Indonesia and, in our view, they are more likely to support a market-led, as opposed to a regulatory-approach to reforming bird-keeping because the latter could be perceived as an attack on or interference with their cultural identities.

Our findings suggest that *c*. 2.5 million birds are acquired by households each year, of which 758,250 are wild-caught native songbirds, 60,230 are wild-caught native parrots, and 146,210 are wild-caught imported songbirds. Considering that the five cities sampled represent only a quarter of Indonesia's 80 million urban population and bird-keeping is also popular in rural areas, our figures suggest that Nash's (1994) estimate of 1.3 million wild-caught birds per year may be conservative. However, we stress that our figures relate to birds acquired by a household and not from the wild. Long-lived species such as parrots may change hands several times before they die and in this category the number of birds taken from the wild may be substantially less than our indicative figure of 50,590 acquired per year. Conversely, mortality of wild-caught songbirds in the supply chain between the point of capture and purchase by a bird hobbyist is believed to be high and the indicative figure of *c*. 614,000 may be an underestimate of the birds taken from the wild.

Our survey lacks the precision to estimate the numbers of threatened or CITES-listed species involved. The list of species named by respondents suggests that bulbuls *Pyconotus* spp., starlings *Sturnus* spp. and white-rumped shama *Copsychus malabaricus* were among the more popular wild-caught native species kept. In the absence of data on populations of commoner species in Indonesia it is difficult to gauge the impact of bird-keeping on wild populations. However, common bird populations on Java have declined markedly in the last 50 years (Holmes, 1995) and a hobby on this scale must add a significant additional stress to these populations.

The large number of domestic and commercially-bred species kept show that substitution is already happening on a large scale. This is borne out by the fact that bird-farms (mostly located in East Java) were the fifth ranking buyer of magazine advertising space in 1999 (A.C. Nielsen, own data). Moreover, the large proportion of birds acquired as a gift or from a friend or relative suggests that small-scale breeding and exchanging of birds among hobbyists is widespread.

A key finding of this survey is that bird-keeping is commoner among richer households and that wild-caught species are kept more frequently in richer and better educated households. These households are easiest to reach and more likely to be swayed by social marketing techniques promoting commercially-bred alternatives. This is because hobbyists in these households are likely to buy specialist magazines, be members of clubs and societies, and more able and willing to make an ethical choice.

In summary, this study finds that bird-keeping among urban Indonesians is of a scale that warrants a conservation intervention and exhibits a profile that suggests substitution with commercially-bred alternatives would be an effective response. Two additional points merit note.

Firstly, whilst the cost of some wild-caught species is low that of several species of conservation concern is high. For example, at the time of this study straw-headed bulbuls were selling for USD 120, hill mynas for USD 85–250 depending on their vocal repertoire, and *Zoothera* thrushes for >USD 200 (Jepson *et al.*, 1998; P. Jepson, unpubl. data; C. Trainor & I. Setiwan, pers. comm.). Whilst the breeding of many 'soft-bill' species is difficult, the value of some species and the size of the market may be sufficient to interest investors willing to overcome the technical challenges that commercial breeding of these species may pose.

Secondly, the bird-keeping hobby revolves around a sophisticated appreciation of bird song, form and coloration. Birds with a pedigree of winning song contests or with a novel vocal or physical characteristic are particularly sought after. For example, in 1998 hill mynas able to sing Ricky Martin's World Cup theme song appeared on the market and fetched three or four times the normal price. Commercial breeding can produce birds with pedigree or vocabularies and endearing behaviours. Marketing such birds as a superior 'product' to a wild-caught bird would generate business as well as conservation benefits.

This survey did not provide sufficient data to design and develop a market-led response to mitigate impacts of the bird-keeping hobby on wild bird populations. Although our survey technique enabled a large population to be surveyed at low cost it lacked precision and deep insight. A dedicated survey adopting social marketing principles would be needed to design a campaign aimed at changing the culture of bird-keeping in Java. We suggest that this should include an attitude survey of hobbyists to ascertain their motivations and preferences, and to generate the knowledge base for a targeted social marketing campaign. This should be coupled with exploratory meetings with bird farms to ascertain the feasibility of breeding species of conservation concern, their interest in doing so, and their readiness to engage with some sort of accreditation and labelling scheme that would provide assurance that wild-caught birds cannot enter the supply chain.

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Biographical sketches

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