WELFARE ENVIRONMENT AND TOURISM IN DEVELOPING COUNTRIES

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Abstract

Recreation can be seen as a normal commodity with a price, various quality attributes, substitutes and compliments. But it differs in many ways from most other goods, both on the consumption side and the production side making welfare estimations less straightforward. In this thesis theoretical and empirical aspects of long distance tourism in developing countries were analysed. The fact that international long-distance sites typically are visited only once in a given period and that the consumers and the substitute sites are scattered all around the world makes conventional valuation techniques difficult to apply. An alternative approach was therefore developed assuming that the good was indivisible in consumption i.e. that the site was either visited once or not at all. This method was applied to a case study in the Western Indian Ocean where the recreational loss from coral bleaching for the islands of Zanzibar Mafia was estimated. The result further highlighted the complexity of consumer behaviour for these types of goods where the visitors stated a disutility from bleached reefs that was not revealed in their consumption behaviour. Tourism is often considered to be a 'clean' and labour-intensive industry and thus often encouraged as a means to boost the economy in developing countries. However, the fact that local and formal institutions in developing countries typically are less developed and that the existing norm systems and culture are more vulnerable might suggest that the establishment of the industry does not necessarily improve the local people's welfare. In line with this, the potential and underlying factors conducive to trickle down to occur when tourism was established on Zanzibar were analysed. The study showed that local people's welfare is significantly improved by enhanced bargaining power.

Paper 1

A model is developed to estimate recreational welfare measures for access to and changes in quality attributes at long distance single-visit tourist sites with only on-site information available. By defining the good (a visit to the site) as indivisible in consumption, welfare measures are derived by simply capturing or estimating the choke price(s). Stated and revealed methods suitable to derive and estimate choke prices are presented followed by a theoretical discussion of the empirical alternatives and obstacles in using these methods for the scenarios present for long distance recreational decisions.

Paper 2

The welfare loss of *de facto* ecological damage at an internationally visited recreational site was estimated by comparing stated preference information from before and after the actual change in quality occurred. Estimates for access to the site and for access to coral reefs before and after coral bleaching and mortality hit the Western Indian Ocean in 1998 were derived using the cost of the trip as a payment vehicle. The model assumes that these sorts of trips are indivisible in consumption. It was found that despite stated losses in utility due to bleaching the tourists still continued to visit the site.

Paper 3

Factors affecting the welfare of poor rural people in a situation of economic, social and institutional transition were analysed using the entry of the tourist industry into small traditionally governed villages in Zanzibar as a case study. The Nash bargaining solution was used as a focal point to model negotiations between a villager and an investor. The model was extended to explain distortions in bargaining situations including institutional failures, asymmetric information and asymmetric bargaining ability. It was found that the ability to credibly refuse a deal was the first necessary prerequisite for villagers to participate in negotiations for compensation. This was secured by enforced formal and informal rights but in addition had to provide

meaning in traditional law and local reality. Due to the non-cooperative character of the game, lack of harmonisation between the local institutional framework and the investor's framework distorted the game due to asymmetry in information of the investor and the villager. Differences in outcomes when the village negotiated with local compared to foreign investors were used to assess the role of bargaining power for trickle-down to occur. The result indicated that gradually empowering local communities is important to achieve a combination of local welfare and sustainable tourism.

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Preface

About one and a half year ago I went to see a fortuneteller. It did not matter which area of my life she told me about (love, health, career, children, money…); she always started by saying that she could see some sort of paper-she could not say what it was but it seemed to be very important to me. At one point she exclaimed, with her own special accent 'I see paper, paper and paper; you are completely surrounded by paper, what is this paper?' And yes I realise that writing this thesis has completely permeated my life more so at some times than at others but it has definitely consumed a lot of my time, energy and presence. Many times (most, actually) the process has been exhilarating but it has also been connected to periods of enormous frustration. What I do know for certain is that my path would not have been exhilarating in the slightest without the many wonderful, talented and generous people that the work has led me to meet. Nor would I have been able to overcome the most painful periods without the support of these same people. Without you, this thesis would not have been and I am truly grateful to all of you; so very, very grateful. I want to mention all of you here individually but I also know that some of you will be grouped into a situation or an institution; I apologize for that.

Back to the fortune-teller who said she could see two 'mature and good men' who seemed to be very important for 'this paper'. A central figure during the whole venture and one easily identifiable as the first of these two good men is the person who first introduced me to the idea of doing a PhD, my supervisor Thomas Sterner. Thomas, I am eternally grateful for the support that you have provided; your trust in me, your enthusiasm for my work (any idea I possibly had), your guidance

and your great friendship. Your generous, open, intelligent, curious, multilingual, multicultural and multi-everything approach to life is apparent in all you do; it has in many ways (with the great help of others) formed the atmosphere at the EEU. Thank you so much for everything you have taught me, the many good times shared with you and your wonderful family and the great respect you have shown for my choices in life.

The second mature, good man is just as easily identifiable, my other supervisor, Karl-Göran Mäler at the Beijer Institute. This warm-hearted man has a mind that does not only sweep economists off their feet but can also pursue any area of interest in an intellectual discussion. The numerous of times we have spent discussing problems or theories by the white board in the conference room at Beijer has in many ways laid the foundation for this thesis. The fantastic thing about these sessions is that you always made me feel like I had something important to say even though many times you must have felt frustrated by our discrepancy in knowledge. I feel enormous gratitude for the time, effort, patience and enthusiasm you have shown for my intellectual development. This is something that will for always stay with me. Thank you so much, Karl-Göran.

The inspiration for this work came during my Minor Field Study in Tanzania in 1993/4 and the work to follow in that geographical area. Without the input, support and many happy moments I have shared with colleagues at the Institute of Marine Sciences (IMS) in Zanzibar, at the University of Dar es Salaam in Tanzania, with friends in Zanzibar, Mafia and mainland Tanzania this thesis would not exist. I especially cherish the friendship I developed with my colleague Zeinab Ngazy, *asante sana Dada,* many great moments with the students in Sida/SARECs Regional Marine Economics project, Razak Bakari, Adolf Mkenda, Irene Ngugi, Armindo Nhabinde, Delphin Prosper, and Festus Wangwe. Thank you everyone at IMS in Zanzibar who provided support with work, facilities, smiles and laughter. *Nimependezwa sana* the whole time. Especially thank you Dr. Ngoile for your initial support of the economic activities and later Julius Frances who has continued to be a great support for any possible initiative. I also wish to thank my colleagues at the University in Nairobi, at KMFRI in Mombasa at Universidade Eduardo Mondlane,

the welfare of coastal communities. Thank you Mats Segnestam and Tomas Andersson for your admirable work and the spill over effect it has on the rest of us.

Despite spending years and hours of research trying to define and understand well-being, the constituents and determinants of well-being in *real life* were always there, provided by friends and family. Joanna Stiller the person who has been there since we started to discover the world outside of Landvetter centrum, my source of true happiness and sincere support in life. I have so many memories that can't be expressed in words, tack Joascha. Christina Magnusson has been there for me ever since the world was extended to down town Gothenburg. Thank you for your sincere friendship and everything you have taught and given me (thank you for acting landlady during my exile in Stockholm too). Christian Azar who epitomise the word well-being by simply being; thanks for the endless situations where you have turned fog into sunshine, bad into good and mess into order (or maybe the opposite sometimes-all for the best). Thank you Dodi, *Mein liebe Apfelkuchen* who is far away but still so close. Thank you Miriam Huitric who I developed a kind of symbiotic relationship with at the Beijer Institute. This spooky simultaneous physical and mental state eventually became such a natural part of life that neither of us were surprised to find we will be defending our thesis at the same time. To share all the joy, frustration, anger, disappointments, excitements, anxiety and even periods of zombie-like indifference, with you during all the times we have had lunch on the terraces, done our jogging tour, yelled between the plastic curtain that separated our offices, shared some wine at Babs-Bar, cycled home or watched a play-all this has been irreplaceable. I do not know what I would have done without you! Susanna Lundström thanks for the support you have provided this last stretch of the battle. Thanks for letting me benefit from this gift of yours to always show up exactly when it is needed. You introduced me to Alex too. Alex, thanks for your wonderful support the last panicking weeks before handing in. '*En helt ny Värld'* is hopefully approaching now! Thank you Sofia Näsström, Andrea Tegstam, Ann Traber, and Katharina Wallentin who have been full of fun and intellectual stimulation and have provided a retreat when the pressure in the office was too high. Also a source of

family feeling with the numerous get together's at Ann's and Teddy's place or around my kitchen table.

My parents have always been there to support this decision of mine, to finish this thesis, which has resulted in my working at Eastern, Midsummer, Summer holidays and similar family get-togethers, sorry about that. I hope I will be more present now. Thank you for your wonderful support, especially with Viggo. Linda, my brave sister, thanks for being there for me all the time. Jacques, Monsieur, thank you for being such a devoted and wonderful father to *le petit Ratanjole* and for your great efforts in helping me get this done. *Merci beaucoup Andrè et Denis Rey pour etre les meilleures farmor et farfar et Helen pour etre le plus genial faster.*

I dedicate this thesis to Viggo my son. The one who has been the most concerned about the time I have spent in the office. Thank you*, min älsketofs*, for being there for me and forgive me for not always being there for you. At last, the "Yellow Book" is ready! I am very sorry it does not have as many nice pictures as I know you would have wanted and thanks for helping me with the graphic design.

Stockholm, May, 2004

Jessica Andersson

To Viggo

Introduction

The papers in this thesis form a theoretical and empirical investigation of welfare measures for single-visited and unique international tourist destinations in developing countries. Although every chapter in the thesis deals with tourism the hope is that parts of the work can be applied outside the export of recreational services as many other resources in developing countries are being exported in a similar manner. Examples are prawn farms in the mangroves, trawling industries, oil fields and national reserves. When an export industry is established in a developing country, questions of distribution and social welfare arise. The last part of the thesis deals with this.

A proper analysis of these issues requires some in-depth understanding of welfare economics, and in particular of welfare economic aspects of the consumption and production of recreational services. The first part of the thesis is dedicated to estimating welfare measures for international tourists visiting a unique site[1]. The typical behaviour of long distance travellers complicated the valuation procedure. The underlying reasons were that international tourists tended to visit long distance sites only once in a given time period[2] and that the sample and the substitute sites were scattered all over the world. An alternative model where both stated and revealed valuation techniques can be used is proposed (Paper 1). The model developed rests on the assumption that the good (a visit to the site) is defined as indivisible in consumption.

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[1] The word 'unique' refers to the character of the site that is decisive for the decision to go there, as opposed to for example mass-tourism sites.

[2] For some international tourist sites the time period is often a lifetime ('been there', 'done that', 'bought the T-shirt'- attitude).

In the subsequent paper (Paper 2) the model was empirically applied to estimate the recreational cost of a natural catastrophe that occurred in the Western Indian Ocean in 1998, when corals due to increased sea temperature were bleached or died. Data before and after the catastrophe made it possible to apply the model for a quality change using both revealed and stated preference methods.

In Paper 2 recreational welfare measures for Zanzibar Island in East Africa were estimated. While the production of recreational services in an exotic place such as Zanzibar can be a source of welfare for visiting tourists, it can also lead to dramatic changes in welfare for the local people. Many of these welfare changes are difficult to capture- they are uncertain and the underlying values are priceless in the literal sense of having no market values. The last paper in the thesis analysed the welfare implications when tourism entered rural villages in Zanzibar. This was addressed by analysing if and why the villagers were compensated for loss of land and income sources and if any trickle down occurred. It was found that the ability to bargain for compensation was weakened by institutional failures, asymmetric information and by an asymmetric bargaining ability (between the investor and the villager). The Nash bargaining solution was extended to include these distortions and then applied to various negotiation situations that typically occurred when tourism entered Zanzibar.

The underlying reason for searching theories and ways to estimate welfare is to be able to compare different states of the world (and subsequently make good decisions). Comparing and ranking different states of the world is a normative procedure even though economists have in vain tried to find theories using little or no value judgments in this process. In doing this and as an important reminder of how different the world might appear to us I would like to end this first section of the introduction with a little story written by the Danish director Lars von Trier when he received the Peace Price from UNICEF and the American Aids fund. He sent it to be read out loud, but the committee censored it. Here is the uncensored version (in my own translation)[3]. "*Dear Peace Committee! I believe as you do in peace. And we who believe in peace see it as our noble mission to make everybody else in the world*

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[3]Taken from Aftonbladet 14 February (Valentines day) 2004.

believe in the same way. But everybody does not do this. The world's population is like two tribes living together in the desert. One live in a country with a well; the other must manage without. The tribe in the country with the well wishes there to be peace. The tribe in the country without a well does not wish there to be peace, but water. That tribe is probably a bit uncivilised. It does not even have a word for peace. On the other hand it has a word for thirst, which in their situation really is the same thing. The peace committee in the country with the well is made up of good, wise, rich, beautiful people who are not thirsty (and therefore they have time and energy to work on the committee) The people in the country with the well talk a lot about the Peace prize, that the committee gives to people in the country with the well. The tribe from the country without the well does not talk very much about the Peace prize. I thank you for my Peace price. Lars von Trier".

A reminder of the openness (and humbleness) we must approach any attempt to solve (or find nice models for) other people's situations.

Demand theory

The first paper in the thesis develops a model to derive demand for long distance recreational services. Similar to the Travel Cost Method (TCM) the cost of travelling to a site is used as a proxy for the price of consuming the recreational services at the site. But while the TCM builds on the relationship between different costs of trips and the number of visits an individual conducts the model developed in Paper 1 is based on the assumption that the good (the visit to a site) is indivisible in consumption, i.e. that it is either consumed entirely or not consumed at all in a given time period. Demand is in other words decided in advance (something that is otherwise an empirical matter) where the price of the trip is used as a payment vehicle. This approximation to reality, however, showed support in empirical studies including the survey in Paper 2 where long distance international travellers typically visited Zanzibar only once, maybe even in a lifetime, and that there were not large deviations in the number of days the individual stayed at the site.

The theory underpinning welfare estimations builds on the assumption that welfare can be defined from the individual utility function. The individual is

assumed to maximize utility $u(z, X, q)$ subject to his or her monetary and time budget (although time will not be dealt with here): $Y = z \cdot p_z + X \cdot p_x$, where z represents the number of visits to the recreational site, q environmental quality or attributes at the site and Y exogenous income. The X represents "other goods"[4] which can be a substitute or a complement to the recreational service, or simply be a numeraire whose price is one. The p_x is the price of "other goods" and p_z the total cost of the trip to site z. The result yields a set of individual ordinary (Marshallian) demand functions:

$$z^M = z(p_z, p_x, Y, q)$$
$$X^M = X(p_z, p_x, Y, q) \tag{1}$$

With these functions at hand it is possible to estimate the value of recreational service flows and their changes as well as to make prognoses about visiting rates when prices or attributes change. By integrating the demand for visits to site z in (1) for the current price and for the price where the individual exits the market (the choke price), the consumer surplus (CS) can be estimated. This is the 'value' that the individual attaches to having access to the site. Theory, however, says that the 'exact measure' of a welfare change should be estimated from the Hicksian or compensated demand curve. The ordinary demand function has the unwanted property of including income effects, which will be avoided by estimating the compensated demand function. The two are related through the theory of duality. Referring to the same variables as in the utility maximizing example above, the individual instead minimizes expenditure, which in our model is either spent on visiting the recreational site we are investigating or on 'other goods', subject to the attainment of minimum utility:

$$\min p_z z + p_x X \tag{2}$$

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[4] To aggregate 'all other commodities' to 'one commodity' is possible if the relative prices of 'the other commodities' do not change. To assume that relative prices of 'the other commodities' do not change is less realistic if observing a longer time period.

s.t

$$u(z, X, q) \geq U$$

$$z, X \geq 0$$

The solution, $z^H = h_z(p_z, p_x q, U)$ and $X^H = h_z(p_z, p_x q, U)$ is a set of Hicksian or compensated demand functions. The demand function for access to the recreational site z^H shows the quantity (the number of visits) demanded as a function of prices and utility.

In the case of indivisibility in consumption the good is, as noted, consumed once or not at all and the Hicksian demand has the same shape as the Marshallian demand, but the respective choke prices (the price where the individual stops visiting the site) might differ. Demand for an indivisible good and 'the other good' are illustrated in Graph 1 where the Marshallian choke price of the indivisible good is denoted $\tilde{p}_z^M$. The choke price for the Hicksian demand is in Paper 1 referred to as the maximum compensation and since it is a function of utility it depends on the reference utility attained. The relationship between the maximum compensation and the Marshallian choke price depends on the relation between the individual's factual price of visiting the site and the choke price, before and after any change. This is because it is the relation between the factual price and the chokeprice that determines if the individual visits the site or not, which in turn determines the reference utility.

Substituting the compensated demand function into the objective function in (2) yields the optimal value function, the *expenditure function*, i.e.

$$e(p_z, p_x, q, U) = p_z \cdot h_z(p_z, p_x q, U) + p_x \cdot h_z(p_z, p_x q, U) \tag{3}$$

The expenditure function shows the minimum expenditure necessary to achieve utility U at prices p. The expenditure function and the Hicksian demand function are related in Sheppards Lemma:

$$h_z(\mathrm{p}_z, \mathrm{p}_x, q, U) = \frac{\partial e(p_z, p_x, q, U)}{\partial p_z} \qquad (4)$$

The expenditure function is at the heart of welfare theory as will be obvious in the text below. This is because given the set of prices, it associates a dollar value with each utility level making it a money metric of utility. The important consequence is that it becomes possible to compare welfare, particularly at an individual level. In the subsequent discussion specific issues relevant when estimating recreational welfare measures will be addressed.

Graph 1. The Marshallian demand for visiting site z, δ_Z indicates the visit to the site; $\delta_z = 1$ if the individual visits that site and $\delta_z = 0$ if the individual does not visit it. The demand illustrated for the numeraire (all other commodities) assumes that the individual prefers staying at home when exiting the market for z.

Welfare estimations

The value of access to a site

To estimate the value of access to a resource (or site) is to compare *with* or *without* the resource scenarios. It means that these sorts of estimations are useful when facing the option of completely removing a resource, or when it is degraded to the point that recreational activities are impossible or dangerous to carry out. Suppose, for example, that the water in a bay is seriously polluted. If the government forbids entry to the water and to the adjacent beaches on the ground that it is too dangerous, then the recreationist loses *access* to the site. If instead only swimming is forbidden and sunbathing on the beach is allowed, then the pollution of the bay has only changed the quality of the recreational experience, while access is not lost.

The welfare effect associated with the elimination of access to the recreational site is defined as:[5]

$$w = e(\tilde{p}_z, p_x, U) - e(p_z^0, p_x, U) \tag{5}$$

where p_z^0 is the *current price* and $\tilde{p}_z$ is the *choke price* for z. For simplicity it is often assumed that z is a *non-essential* good. In essence this means that there exist combinations of other goods that will compensate the individual for the possible loss or absence of z. In other words, $U(x, z) = U(x', 0)$, meaning that any bundle including z can be matched by a bundle (x') excluding z.[6] Accepting the assumption of non-essentiality for recreational goods is in general no problem since it is a luxury good. To find the information to estimate equation (5) is, however, less straightforward. This is because to estimate the expenditure function it is necessary to know the utility function. The crux with behavioural models such as the TCM, is that it does not provide information about the utility function since it derives the Marshallian demand function directly from information about the cost of travelling and the number of trips undertaken by the individual.

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[5] For notational purposes the quality variable is removed.

[6] Expressed in terms of the expenditure function, this means that $\lim_{p_z \to \infty} (e(p_z, p_x, U)) = k$ where k is a strictly positive constant.

How then can the expenditure function be derived? First it should be pointed out that an expenditure function that yields the demand function derived by a behavioural model does not always exist. This is because not all demand functions can be derived from maximizing a utility function, and this is true even though the demand function possesses all the correct properties. [7] The expenditure function can be derived with the sole information of the ordinary demand function available, but certain conditions have to be fulfilled. To find an expenditure function consistent with the set of ordinary demand functions such as z^M and X^M in equation (1), we have to verify that they have a symmetric, seminegative substitution matrix (the integrability conditions). Then, in principal, by using the Slutsky restriction it is possible to solve the systems of partial differential equations and derive the expenditure function. (For the mathematically interested reader, see Appendix A).

Alternative ways to obtain the expenditure function have been proposed by Hausman (1981) who uses the fact that Marshallian demand curves are derived from the indirect utility function i.e from Roys identity. The conditions that the demand function has a symmetric and a negative semidefinite substitution matrix still have to be fulfilled. Vartia (1983) proposes a practical numerical algorithm to compute the compensated income from any ordinary demand function, and Breslaw and Smith (1995) propose a quicker algorithm that is empirically tested by Lavergne et. al. (2001). These are methods that were made possible using econometric refinements and that do not change the theoretical foundation.

The indivisibility definition of consumption used in Paper 1 results in the fact that the 'only' information that needs to be captured for welfare estimations is the visitors choke price and the factual price of visiting the site. From this the Marshallian demand curve is derived and the consumer surplus can be estimated which is simply the factual price subtracted by the choke price. As pointed out above, the maximum compensation depends on the reference utility attained, but since only use-values are estimated it is assumed that non-participants have zero willingness to pay for access, meaning that there is only one reference utility, i.e. when the good (the trip) is consumed. In Paper 2 where the model is applied, both stated and revealed

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[7] This is mainly because the properties of the demand function follow from utility maximization and not vice verse.

preferences are used to capture the choke price. In both cases this is the Marshallian choke price, the price where $V(Y^i - \tilde{p}_z, q_z) = \max\{V_0, V_1 ... V_n\}$ and V_i, $i = 0,1...n$ indicate the utility of visiting a substitute site (or staying at home).

It should be pointed out that throughout the discussion the assumption has been that we deal with individual data. Aggregated data or aggregated individual demand functions cannot be solved using the integrability conditions mentioned above unless certain assumptions are applied, which will be discussed later.

The value of a quality change at the site

More common than the extreme case of completely losing a site is that the character of the site changes. For example in Paper 2 the loss of recreational value of reefs due to coral bleaching is estimated. Bleaching is caused by increased sea temperature that can eventually lead to extensive coral mortality. The quality of diving or snorkelling on the reef then supposedly decreases compared to before the bleaching event. Assuming that a parameter q, reflecting such quality, exists and is measurable (for example percentage of bleached reefs), then the welfare measure for a quality change is defined analogously to the way it was defined for access, namely:

$$w = e(p_z, p_X, q^0, U) - e(p_z, p_X, q^1, U) \tag{6}$$

where q^0 is quality before the change and q^1 is quality after the change. The crux is to find a money measure since there is no price attached to the change in quality. Consumer theory typically solves this by observing changes in the consumption of a related market good. The TCM, for example, infers the value of the quality of recreational service flows by examining changes in visiting frequency as the level of the quality changes. The value of reef quality can be estimated by observing how the demand for trips to the site changes after the bleaching. The problem of how to measure this remains, because not all quantities are converted to prices in the dual, i.e. q is not converted. Referring to the TCM model it is assumed that the individual has a conventional quasi-concave utility function $u(z, X, q)$ in which she chooses levels of z and X, but takes the amount of q as given. The income Y is spent on z and X. We

basically want to assess the implicit value that the individual places on q, which is revealed by her decisions regarding z. The solution to the utility maximizing problem is a set of restricted Marshallian demand functions as described in equation (1). Substituting these back into u yields the restricted indirect utility function, which with Roy's identity implies that:

$$p_q(p_z,p_x,q,Y) = -\frac{\partial v(p_z,p_x,q,Y)/\partial q}{\partial v(p_z,p_x,q,Y)/\partial Y} \tag{7}$$

Equation (7) yields the marginal willingness to pay for environmental quality, which results from duality between prices and quantities and implicitly defines an ordinary demand curve for the quality variable. Dual to the utility minimizing problem is the expenditure minimization problem as described in the previous section when the derived compensated demand functions are substituted into the objective function to yield the expenditure function in equation (3). From the first order condition, we arrive at the counterpart to equation (7):

$$p_q(p_z,p_x,q,U) = \frac{\partial e(p_z,p_x,q,U)}{\partial q} \tag{8}$$

Equation (8) implicitly defines a Hicksian compensated demand curve for the quality variable.

To derive the expenditure function from the estimated Marshallian demand function, weak complementarity need to be invoked. Weak complementarity was introduced by Mäler (1971, 1974), and by restricting the marginal utility of q to zero when the consumption of the private good (the number of trips) z is zero[8] it is possible to solve for the utility and expenditure function. The assumption of weak

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[8] This can be expressed in several ways, for example:
$$\frac{\partial u(X,0,q)}{\partial q} = 0 \quad \text{or} \quad \lim_{p_z \to \infty} \frac{\partial e(p_z,p_x,q,U)}{\partial q} = 0.$$

complementarity is applicable when estimations are restricted to use values. Many natural resources, specifically those that are unique and spectacular (such as coral reefs), are likely to have non-use values and option values attached to them. A method such as the TCM is only able to capture use values.

The expenditure function can in other words be found for the derived ordinary demand function also for quality changes. This is true provided that the demand function is correctly specified (meaning that it is symmetric and negative semidefinite) and by assuming weak complementarity. Lankford (1988) describes techniques to recover the expenditure function when a quantity constraint is present. The main limitation of this technique is that information about the behaviour of the individual if there was no constraint is required. Ebert (1998) shows that adding information about the marginal WTP function for non-market goods makes it possible to recover the underlying preferences.

In Paper 1 where the model for single-visited international tourist sites is developed the change in demand is obviously not based on a change in the number of visits. Since the choke price is a function of quality the shift in demand due to a quality change is a shift in the choke price. Consequently, the respective chokeprice for the two quality levels is the 'only' information required for welfare estimations. To capture this using RP methods information before and after the change needs to be captured, alternatively that two identical sites that only differs with respect to the quality aspect are surveyed.

In Paper 2 where the model is empirically applied to estimate the recreational loss of welfare from coral bleaching the great difficulty in defining and measuring quality becomes apparent. The incident of bleaching was patchy and only about 20% of the respondents had seen bleached corals while diving on the affected reefs. The study showed that despite the expressed disutility from bleached reefs, it was not revealed in the visitors' behaviour.

What difference do the different welfare measures make?
Accordingly, it is anything from fairly straightforward to difficult to derive the expenditure function from the estimated ordinary demand curve in order for 'truer'

welfare measure to be estimated. But, what difference does it make? Lets briefly look at the differences between the three most recognized welfare measures in the literature, i.e. compensated variation (CV) equivalent variation (EV) and the uncompensated consumer surplus (CS). [9]

First of all, the fact that the CV and the EV both are compensated welfare measures does not mean that they possess the same properties. The fact that the EV evaluates all changes from an initial position results in that it can be interpreted as an index of utility, which is not the case for the CV measure. This is particularly relevant in situations where different projects are to be compared. The EV measure ranks two policy options (or any number if we had additional projects) in the same order as the underlying utility function. This is because EV measures use the initial quality level as a base bundle when comparing the bundles. [10] The CV on the other hand evaluates changes at the final q values[11] and both CV and q adjust in the same expression. This might result that CV^2 may exceed CV^1 despite the fact that the individual's utility function ranks q^1 over q^2. Consequently we might invest in the wrong project. It should be noted, however, that both money measures are suitable for binary comparisons.

Particularly direct valuation methods such as the contingent valuation method (CVM) compare the difference between CV and EV measures. In those studies, estimated compensated welfare measures often show unexpectedly large differences between the CV and the EV (Johansson, 1993). Hanemann (1991) proposes that in the case of CVM studies the substitution possibilities between environmental goods and other goods (money) affect the magnitude of the difference. The more difficult it is to replace an environmental good with other goods (i.e. the steeper the indifference curves) the higher the compensation needed in order for the household to accept the loss, which creates a large difference in the EV and the CV. Similarly, if there is a high degree of substitutability, then the compensation measure and willingness to pay

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[9] Welfare under quantity constraints referred to as equivalent surplus (ES) and contingent surplus (CS) are other measures commonly recognized, but they will not be covered here.

[10] I.e. $V(p_z, p_x, Y + EV^i, q^0) = V(p_z, p_x, Y, q^i)$.

[11] I.e. $V(p, y - CV^i, q^i) = V(p, y, q^0)$.

should be close in value. For additional discussions, see Gregory (1986) and Harless (1989).

For indirect valuation methods the differences between compensated and uncompensated measures are more relevant. The CS is neither the willingness to pay nor the willingness to accept payment as compensation for a price or quality change. Instead it is simply the area to the left of the estimated ordinary demand curve between two prices (or between two curves for a quality change). The fact that the CS lies between the two theoretically correct measures has probably contributed to the fact that travel cost estimators for years have estimated the ordinary demand curve and presented the CS as their best welfare estimate. Smith and Karou (1991) conducted a meta-analysis including 77 different TC studies with the objective to explain the variations in recreational benefits estimates and all 77 studies only measures CS estimates. Willig (1976) makes a rigorous investigation of the differences between the compensated and uncompensated welfare measures in his 'Consumer Surplus without apology' where he derives conditions on income elasticities and expenditure shares implying a close agreement between Hicksian and Marshallian measures. Basically, Willig concludes that in most realistic cases the difference between the measures is almost trivial. [12] Randall and Stoll (1980) make a similar comparison for a quality change. Other approaches to bridge the gap between the Marshallian measure and the compensated variation have been presented by Hanemann (1980, 1989), Larson (1988) and Weitzman (1988). Paper 1 surveys the empirical implications for the different welfare measures when the good is defined as indivisible in consumption.

Should we expect income effects to be large for recreational services and does recreation expenditure constitute a large portion of the budgets of individuals? This depends on the character of the good- recreation includes everything from access to

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[12] Willig's argument does not apply to welfare estimations for access (or quality) derived from the TCM since, for most functional forms, the Hicksian and Marshallian choke price differs and Willig compares the area to the left of the two demand functions for a *price change* using the same initial and new price. This means that the area to the left of the Hicksian function and above the Marshallian choke price is not included and the approximation will not be as close as according to Willig. An alternative would be to view the difference between the areas of the Hicksian and the Marshallian demand functions in terms of the same quantity change. For estimations of changes in quality, Willig's argument is even less appropriate. See Bockstael et. al. (1991).

an adjacent beach strip to visiting an exotic resort in a far distant country. For certain types of recreation such as exclusive long distance travelling, differences in income elasticities are probably much larger between participants and non-participants rather than within a sample of visitors.

For behavioural models the theoretically 'correct' value is derived from data and analysis subject to the judgements and specifications made by the analyst. Smith and Karou (1991) found in their study that the largest implication of the CS estimate was caused by the treatment of the opportunity cost of time, the treatment of substitute sites and by the adjustment for the truncation effects that on-site surveys had. It cannot be ruled out that the errors in the estimation of the parameters of the demand function by econometric methods can be larger than the theoretical differences of the measures. In empirical studies income is easily subject to errors and particularly when it comes to today's multinational tourism where the individual net income is affected by large differences in the country taxes and social policies. In TCM studies, income plays an even larger role since it enters as a variable defining the price of the good. Integrating back to produce a 'correct' measure i.e. a compensated welfare measure rather than an approximation, is valid only if the precise Marshallian function has been derived.

Aggregation of welfare measures

So far welfare effects of a change in a single recreational service flow for a single individual visiting a single site for a specific period of time have been discussed. On their own these values do not provide much meaningful information. It is as aggregated values they become useful for policy. A site that is lost means a loss of all future recreational opportunities of the services provided by the site. On the other hand, an investment made to improve the quality at a site probably leads to a stream of welfare improvement for a number of years to come. To estimate these future streams of recreational values, a number of issues need to be taken into account such as what the relevant discount rate is, what the probable future stream of visitors is, what the likely future existence of substitute sites is and much more. Literature in

Cost-Benefit Analysis often has extended discussions about this. Here, only aggregation over individuals will be discussed.

By aggregating demand functions for individual visitors, the market demand or the aggregated demand for a recreational site is obtained by:

$$Z = \sum_{i=1}^{n} z_i(p_x, p_z^i, q, Y^i) \qquad i=1,\ldots n \tag{9}$$

The individual demand function in (9) is a function of prices and income. The price for 'all other commodities' p_x is the same for all individuals, but the price of a trip to the site p_x^i is due to varying distances different for all individuals and is therefore indexed with an i. Similarly, income is indexed since it differs among individuals. The question then is whether the aggregated demand function is a function of aggregated income as well, or rather, when can we justify writing the following function?

$$Z(p_x, p_z^i, q, \sum Y_i) \tag{10}$$

To answer this question let us first consider what it really means. For equation (10) to hold, aggregate demand must be identical for any distribution of income among individuals as long as the total sums of incomes are the same. In other words, at any fixed price vector p, the income effect at that price must be the same for whichever individual or recreational consumer we are observing such that the real effect can even out. In other words, the wealth expansion path of all consumers must be parallel. Under what circumstances is this possible? Theoretically this holds when all consumers have identical preferences that are homothetic or when all consumers have preferences that are quasilinear with respect to the good in question. Homothetic preferences (meaning that when income is scaled up or down by any amount the demanded bundle scales up and down by the same amount) seem intuitively more realistic than if all additional income would be spent on recreation as would be the case for quasilinear preferences. To assume quasilinear preferences would also mean that only changes in the demand for one good could be observed, which might not be

very useful. To say that preferences must be identical includes the preferences for quality. Otherwise the individual indifference curves will "tilt" differently and the condition of linear and parallel engel-curves is not fulfilled. In summary all individuals having identical and homothetic or quasilinear preferences is a sufficient condition for aggregate demand functions to be uniquely defined.

The aggregate value and social welfare

The previous section discussed the aggregation of welfare estimates for tourists visiting a recreational site, but what about other welfare effects induced by the tourist industry. Consider the situation where the site is situated in a developing country and the residents cannot afford to consume the recreational services offered by the tourist industry but the residents are affected in other ways. The industry might for example create a number of national as well as local welfare improvements such as new job opportunities. However, in the establishment some individuals might become even more marginalized and experience welfare deterioration due to the entry of the industry. The crucial question is how to compare the aggregated individual welfare of different projects when they create both winners and losers, i.e. what value judgements can be used to rank different projects? This is when social ordering becomes relevant.

     A short introduction to the theory of obtaining social orderings of resource allocations starts with the Pareto Principle. According to the Pareto Principle a project where at least one individual is better off while making nobody else worse off is better than the original state. The good thing with this principle is that only minimal value judgements need to be applied. The restrictive part is, as mentioned for the entry of the tourist industry, that most interventions imply a welfare loss for at least one person which makes it empirically less useful. In addition, ranking based solely on the Pareto Principle is incomplete. Even Pareto-optimal outcomes[13] are non-comparable as are Pareto-optimal outcomes in relation to non-Pareto optimal outcomes. Hicks

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[13] Any allocation of resources in a general equilibrium in a perfectly competitive economy is *pareto optimal*, which is the first basic theorem of welfare economics. The second is the converse that any pareto optimal allocation of resources can be achieved by the solution to general equilibrium in a competitive economy.

(1939) and Kaldor (1939) attempted to overcome this incompleteness by extending the Pareto Principle with a hypothetical compensation test. The two tests state, although using different reference levels, that if there are both gainers and losers in a project but the gainers can compensate the losers in the new project and still be better off, then the compensation test is satisfied.[14] The criterion then becomes one of a Pareto improvement (given that the compensations are paid) since there are no losers in the new project. How does this connect with the previous sections where individual welfare estimates were aggregated? It was shown that a unique measure of the aggregate CV or EV can be defined, given that all individuals have identical and homothetic or quasilinear preferences. The measure that is defined is independent of the distribution of income, but what does this imply and how useful is it? If the aggregate CV or EV is used to indicate whether there has been a Pareto improvement in social welfare, i.e. if the gainers could hypothetically compensate the losers following the change, then we need to be able to rank the different resource allocations. It turns out that if one applies Kaldor compensation criterion and if preferences are identical and homothetic the aggregate CV will provide a ranking of resource allocations identical to that of the Kaldors compensation criterion. This is because identical homothetic preferences give rise to a unique map of non-intersecting community indifference curves.

The hypothetical compensation test is, as the name indicates, hypothetical which is often pointed out as its main drawback. Little (1957) developed the test further by applying an additional test (after the Kaldor test) to see if the resulting change would improve the distribution of income. This adds the dimension of distribution but does not define a welfare improvement. Further attempts to include aspects of equity are instead to create a social welfare function with different weights to different individuals based on their relative needs. Observe that the aggregate CV, which provides a ranking of resource allocations identical to that of Kaldors compensation criterion, is not the same ranking as what would be obtained by a social

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[14] The Kaldor test assesses whether or not those who gain from the project can fully compensate the welfare losses of those who lose from the project. The Hicks test assesses whether or not those who lose from the project can compensate the individuals who gain from a decision not to carry out the project. The Hicks compensation test accordingly uses the project as its reference point.

welfare function. This is because the ranking of resource distribution does not change for real redistribution of income among individuals since it, as discussed in the previous section, does not change the aggregate demand.

The previous section showed how the ordinal ranking of utility was cardinalised with the expenditure function, and that the more measurable and comparable individual utilities are, the more information a planner has as a basis for aggregating social welfare functions. Is it possible, though, to truly compare the welfare of a tourist diving on pristine coral reefs and a local villager's welfare from fishing on the same reefs? Suppose that the two activities are completely excludable. What then are the different implications of lost access to the reef for the fisherman and lost access to recreational activities for the tourist? To start with the good, access to the reefs is a luxury good for the tourist while it is a necessity for the fisherman. Secondly the site might be unique for the tourist, but there are numerous alternative sites she can visit. For the fisherman there are no or few alternative sites to fish at because although it might appear as if he has unlimited access to other fishing grounds, they might be customary owned by other fishermen. On an aggregate level, a larger number of tourists can enjoy the reefs while only this particular fisherman and maybe a few others use it for fishing. In addition, on a macro level there might be other benefits generated from the entry of tourism that could trickle down to the fisherman. To capture this larger picture is a great challenge.

The first challenge is to understand what really constitutes and determines welfare for poor individuals from different cultures, and the first lesson is to realise that it constitutes many aspects. [15] The fisherman might benefit from the generation of new employment opportunities, availability of electricity and a paved road between town and the village when tourism enters. However, at the same time he might suffer severely from reduced access to his fishing ground (that he has a customary but informal ownership right to), lost social status and from increased criminality and exposure of his children to alcohol and drugs. The main advantage of acknowledging

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[15] Dasgupta (2001) makes a distinction between the *constituents* and the *determinants* of well-being where constituents in broad terms include basic liberties (health, happiness, freedom to be) and determinants are commodity inputs in the production of well-being (food, clothing, potable water, shelter). Consequently, the former measures are outputs and the latter are inputs.

that well-being is composed of different variables and then of identifying them is that in the extension, efforts to improve welfare can be directed towards those same variables. Institutions can be created that are directed at aspects that are known to affect well-being as opposed to having a general objective to 'secure the rights of the local people'. But as indicated above, this requires a thorough understanding of what constitutes individual well-being, something that Paper 3 assesses for small coastal villages in Zanzibar. These villages experienced a rapid transition from being fairly isolated to becoming integrated into the international market economy as tourism entered the picture.

Institutions and distribution of welfare

Many areas and resources in developing countries, including those attractive for tourism, are communally governed, and rights to access and extraction are based on tradition, norms and customs. Those institutions have often been formed and shaped over a long time period to fit cultural and ecological aspects of the nearby surroundings. This does not mean that individual and impersonal rights do not exist but that they are secured and have been formed within the communitarian system. The fisherman above might, for example, hold the exclusive right to fish in the creek from which the diving operator wants to exclude him. Within the community borders this right is transferable (it is inheritable it can be sold or leased out) and enforceable, but in a case of conflict with the diving operator it is not formally protected and can accordingly easily be lost without compensation. In Paper 3 the establishment of tourist hotels in small customary governed villages in Zanzibar is used as a case study to analyse institutional factors conducive for the local villagers' welfare. Like the example of the fisherman, the entry of the new industry implies conflicts of interest over land and resources leading to negotiations for compensation between villagers and investors. In a negotiation situation an individual is not likely to accept a deal that decreases the present welfare and there would accordingly not be any risk of deteriorating well-being. As illustrated, this was not the case for the fisherman for the reason of a lack of formal protection of his communal rights. These sorts of

institutional failures and the factors influencing the outcomes of negotiations are identified in Paper 3.

Other reasons that negotiations between a villager and a foreign investor might result in an 'unfair' deal is that negotiations are non-cooperative and that the two negotiators use different institutional frameworks as their basis for bargaining. The former implies that there are no pre-set rules governing or guiding the negotiation situation and the latter that whatever 'rules' the respective players are following are not harmonised. To illustrate with an example from Paper 3: if two villagers bargain for the price of a plot of land, it is likely that they both become pleased with the deal since they act voluntarily and share information and norms. But suppose that an investor buys the same plot of land from the same villager for the same price- then the result might not be equally satisfactory: just imagine that the good that the villager sold was, in accordance with her norm system, the trees growing on the land meaning that she expected to still have access to the area beneath the trees for working and walking. However, the investor expected, in accordance with his norm system to be able to fence in the area and exclude villagers from 'trespassing'. The villager's welfare would then decrease due to the loss of access to the land, which was not realised when selling it. Compared to the fisherman the villager selling land is however better off, since at least he is in a position to negotiate for compensation.

As pointed out, Paper 3 investigates factors that can improve the outcome of a 'deal' using inhabitants in coastal villages in Zanzibar as a case study. However, as discussed, welfare is not easily identified, measured or compared, and as a mean to compare a 'good' deal with a 'bad' outcome, the Nash bargaining solution is used as a focal point and a socially desirable outcome in negotiations. The model is then extended to account for institutional failures, asymmetric information and asymmetric bargaining abilities.

Since both Paper 2 and Paper 3 use Zanzibar as a case study a short presentation of the island is given below. It focuses mainly on historical events that have played a role in the evolution of formal rights, norm systems and restrictions on the island, and ends with a general discussion of the implications of the tourist industry entry based on some of the findings from the respective studies.

The case study site of Zanzibar

History[16]

Zanzibar is comprised of the two islands Pemba and Unguja and is situated in the western Indian Ocean outside of Tanzania in East Africa. The islands have been influenced by a number of diverse formal institutions that have all contributed to shaping the culture and property right structure prevailing today. The East African coast and its islands have been part of the commercial system in the Indian Ocean where trade was regulated by the monsoons, for at least two thousand years. Commerce rather than production formed the basis of the Swahili[17] civilisation that flourished there. [18] This merchant civilization depended on the international trade of slaves, ivory and gold, which did not only permeate the economies but also the whole range of social and cultural life. The Swahili were organised in kingships and acted as middlemen between the African interior and the Asian and European market. According to Middleton (1992) the Swahili society has derived its main characteristics from four factors: the nature of the coast; the trade between Africa and Asia (the middleman role); their long subjection to colonial exchange and political systems; their ethnic composition and their complex historical formation of their society. It is an open and flexible society that still shows acceptance and an ability to adapt to foreign cultures, religions and traditions.

Its great success in trade made it attractive to the Portuguese who wanted to capture the Indian Ocean trade in the end of the 15th century. The maritime and mercantile Swahili states were vulnerable to the kind of violent raids that Vasco da Gama undertook, and several important trading ports in East Africa came under Portuguese ruling. Although the Portuguese lacked the resources for effective control of the whole coast and for monopolising the trade, the Swahili merchant class were not able to overthrow the Portuguese on its own and therefore turned to Omani who

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[16] The information from this section is derived from a number of sources including Middleton (1992), Sheriff (1987), Sheriff and Fergusson (1991) and Chaudhuri (1985)

[17] The word Swahili is derived from the Arabic word that means coast.

[18] When exactly the Swahili civilisation started is uncertain and there is little documented from this period. Middleton (1992) claims that the Swahili have lived along the East African coast and its islands for over a thousand years, but that there were communities before that must have been very similar to theirs except for the adherence to Islam and the use of the Swahili language.

had a similar history of Portuguese domination over its coastline and of participation in the Indian Ocean trade. By 1652 the whole East African region was infested by Omani raiders in open rebellion with the Portuguese. In the struggle between the Omani and the Portuguese for the domination of the area, the Swahili merchant class interchangeably took either side of the combats and sometimes even tried to remain on friendly terms with both. This is a typical trait for the Swahili culture whose identity has been defined largely by this type of strategy, to avoid conflict situations, enabling them to survive centuries of outside contact and remain a viable and defiant people (Middleton, 1992).

The Omani had a dominant role in the area for the next two centuries and the Swahili merchant classes accommodated themselves as best they could in what was emerging as an Omani commercial empire. The Omani Busaidi were established in Zanzibar which offered good sheltered harbours and a weak Shirazi[19] dynasty which had learned in the preceding centuries to swim with the changing political tides. They continued to do so and the local ruler in Zanzibar, the Mwinyi Mkuu, was retained as the chief of indigenous matters. Zanzibar became the most important transhipment market and port for slaves, ivory, textiles and firearms. The Imam of Oman, Seyyid Said bin Sultan, moved his capital to Zanzibar in 1832 and introduced the plantation of cloves which with the help of imported slaves prospered during the following hundred years. During the middle of the century the island was the world leading producer of cloves and the largest slaving entrepôt in East Africa. The clove plantations were situated in areas with the most fertile soil, which was successively cleared for the cultivation. This is when some authors claim that people settled in the coral rag area, which is the area that became the most attractive for tourism some 150 years later.[20]

In 1890 Zanzibar became a British protectorate although the British influence had started earlier. From the 1870s and onwards Zanzibar's social formation

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[19] The Shiraz originates from Persia and had considerable influence in the Swahili culture. The Persian Empire was the most powerful in the Indian Ocean from about 600 B.C. until the seventh century A.C. Many rulers of the medieval Swahili states (and their descendents to this date) called themselves Shiraz, to demonstrate acclaimed cultural origin in southwestern Persia. Historically this appears unlikely. Coastal ruling houses seem to have claimed Persian ancestry in order to show that they were founded earlier than other local rulers of Arab origins (Middleton, 1992).
[20] See for example Sheriff (1991)

had been characterised by a hybrid state of which the Sultan was the nominal head. His power was increasingly limited and controlled by the European consuls. The major blow of the Sultans economic base, which he at least had preserved, was the 1873 treaty abolishing the slave trade followed by the 1897 legal abolition of the legal status of slavery. This had a major effect on the production of cloves in which the slaves had been the main source of labour. Most of the plantation slaves stayed on the property of their former masters, but had no formal right to the land. A system of double cropping developed which was mutually beneficial to the squatters who cultivated between the trees and to the landowners who did not need to clear the land from weeds. Statutory laws developed during this time; in 1920 the urban land planning was initiated, but the laws did not stretch beyond the city boundaries or the plantation belt. The rural areas where the tourism was later to be developed were managed mainly with informal regulations as is further described in Paper 3. Islamic law dominated civil matters.

The Omani Sultans continued to rule under the British protectorate until 1963 when independence was granted. The Sultan was, however overthrown in a short but very bloody revolution, instigated in January 12 of 1964 by the Afro-Shirazi party (ASP). This was the party of the former slaves and the poorest segment of the population. The revolution was triggered by the loss of the ASP in the island's first multiparty election where ASP received the largest number of votes. However, the rivalling, Zanzibar Nationalist Party (ZNP) supported by the Sultan, allied with a group that broke off from the ASP and won the election. This was also the culmination of popular struggle against more than two centuries of aggression and oppression by foreigners, slave traders, Omani colonialism and seventy years of British colonialism. A proletarian dictatorship was formed with Amani Karume as President and only a few months later Zanzibar formed a Union with mainland Tanganyika to become Tanzania. Despite the small size of Zanzibar it preserved considerable autonomy. Zanzibar's own House of Representatives continued to regulate matters concerning only Zanzibar such as land tenure. The President and custom system remained in place.

Several land reforms were undertaken after the revolution, including vesting land in government and the distribution of land titled 'the three acres plot' where land was distributed free of charge to smallholders. The rights to the three acres plot lasted for the rest of the grantees life, but it could not be transferred. Consequently, the incentive to invest in the land was lost and today most of the three acres plots are in bad condition or simply deserted. After the revolution most of the Arab rulers left the island, which meant that many educated people left. Karume was brutal and corrupt and the economy stagnated. In 1972 Karume was assassinated most likely by his own men. Aboud Jumbe came to power in 1977, and ASP merged with Tanganyika's TANU to form CCM (the revolutionary party). A large portion of the population in Zanzibar were not in favour of the union with the mainland, especially because of the fact that the President of the Union, Julius Nyerere, was Christian, while 99% of the population on Zanzibar were Muslims.

Liberalization of the economy in Zanzibar officially started in 1988 but the Investment Protection Act was initiated already in 1986. It included issues about land lease, compensations, tax exemptions (30 months exemption from rent, custom and import duties) and provisions to minimize pollution. In 1992 a multiparty system was inaugurated in Tanzania, and in 1995 the first multiparty election was held. According to official results, CCM won the election but a large portion of the Zanzibar population and the international community did not believe this to be true. Instead the opposition party CUF, which is critical of the current government and proposes increased autonomy for Zanzibar, was thought of as the rightful winner of the election. Because of this, donor agencies have withdrawn projects and aid to Zanzibar.

The entry of the tourist industry

With the liberalisation of the economy, tourism was believed to have great potentials in replacing the clove industry that had been lost (mainly to Asian producers). Investors were enticed with tax exemptions and a fantastic natural capital, perfect for recreation. Formal institutions were installed to deal with investments, land allocation and tourist affairs. The Commission for Tourism (CoT) was

established in 1992 as an autonomous body within the Ministry of Information, Culture, Tourism and Youth to promote Zanzibar as a tourist destination to smaller investors while the Zanzibar Investments Promotion Agency (ZIPA) was established the same year as an independent body within the Ministry of Finance to handle larger investments. The Commission for Lands and Environment (COLE) was responsible for allocating land for hotel projects, surveying and demarcating the plots, settling compensation issues and negotiating the conditions for the leases. The investors were of mixed nationalities with Italians being the most represented particularly in charter tourism. While the procedure for small projects that went through CoT was not defined, the procedure to approach ZIPA included several steps and a great deal of correspondence.[21]

The number of tourists has steadily increased since the launching of the industry, with a recent dip in visitations after the events of September 11th 2001 (See Graph 1 copied form Paper 2). Before 2001 the industry was prosperous and the economy boomed. The Swahili have played the role of middlemen for centuries, taking their commission and profits along with the risks involved in providing complex and often difficult services, but they never controlled the actual trade. This depicts very well the role of the Zanzibar people in their trade of recreational services. The tourist industry is in the hands of the international market where demand is capricious and uncertain and supply is mainly provided by foreign investors (although less so than in many other places as revealed in Paper 3). At any rate, there is little domestic control. As discussed in Paper 2 where the effect of coral bleaching on tourist demand is estimated, the main causes of decreased visitation seem to be political instabilities and epidemic outbreaks. With the recent wave of terror attacks on major tourist destinations, tourists hesitate to visit a newly commercialised island

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[21] The procedure commenced with a letter of intent stating intentions and plans for investments. This was followed by a visit to the site of the representatives from ZIPA, COLE and CoT resulting in a report to be handed over to the Technical Committee of Drawing Approval and Building Monitoring. Next the investor prepared a feasibility study, which was followed by a decision made by the Technical Committee. The preparations were handed over to the Zanzibar Investment Committee (ZIC), which made a decision and sent it to the Director General of ZIPA who issued an interim certificate on behalf of the Minister of Finance. COLE and the investor then signed a land lease after a compensation for trees to the local owner had been paid and the plot had been surveyed. After the commencement of the land lease the investor had 30 months to complete the hotel developments. Plans showing the location of the building and technical facilities (water and sewage for example) had to be submitted to the Technical Committee. After this the Technical Committee granted a building permit.

with strong Islamic foundations. A difference from the historical role as middlemen is that this trade does not only affect the merchant classes but permeates the whole of society including the small coastal villages that used to not be affected by the trade.

Yearly tourist visits to Zanzibar
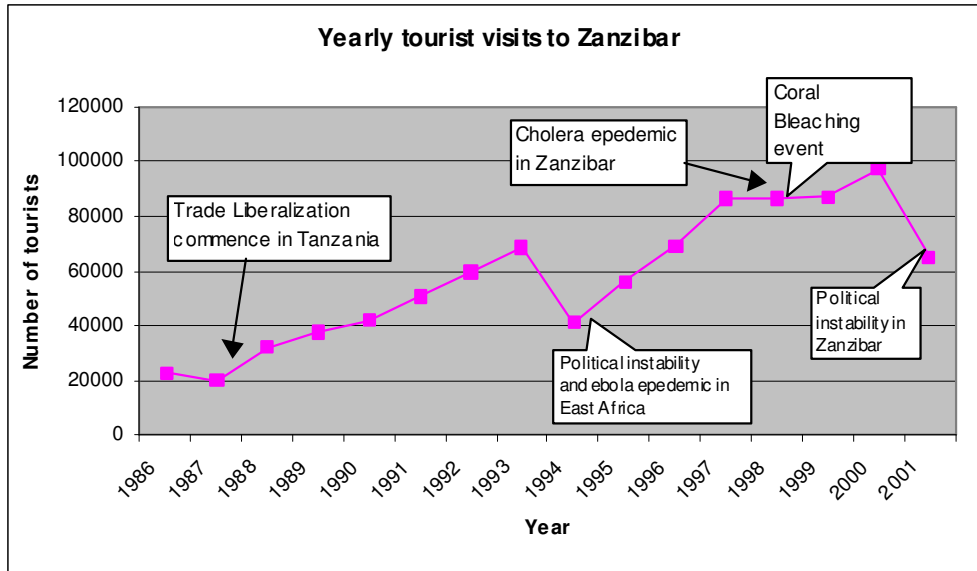
Table 1. Numbers of visitors in Zanzibar since the liberalisation of the economy

Middleton (1992) shows no mercy in his description of tourism on the Swahili culture along the East African coast: '*The coast is the scene of intensive tourism controlled by European entrepreneurs and their African partners, who are virtually never Swahili. The profits are shared by them and the national government and any "trickle down effect" is slight. Tourists and their hangers-on are despised by most Swahili as non-Muslims who bring new commercial and sexual mores and have corrupting influence. This is the final and perhaps the most degrading exploitation of the Swahili coast.*' Middleton makes this observation before tourism was established in Zanzibar and he is probably referring to the Kenyan or mainland coast. The lessons learned from the development of tourism in Zanzibar are to a large extent different. Local people, even in the small villages, did play a role in launching the industry (see Paper 3). As opposed to Kenya the players are to a larger extent Swahili people. The major obstacle for the group investing in the industry has been the decline in

visitations and the great uncertainty attached to the industry. This is NOT to deny there are other problems such as the corruption of the Government and the fact that a lot of labour is being 'imported' from the mainland or even from Kenya.

Summary

Middleton's reflection that profit is shared between foreign investors and the national government probably remains true for many large foreign-owned luxury investments also for Zanzibar. For Zanzibar, however, development was accompanied by several local investments. Why this was the case in Zanzibar and not on the Kenyan coast would be an interesting follow-up of Paper 3 where the local people's ability to bargain is seen as the explanation to an improved participation in the industry. The ability to bargain for compensation for land and for lost income sources was supported by the short distance to decision makers who acted within the various bodies installed when the industry was launched. This was facilitated by the small size of the island that still encompassed all government bodies important for decision-making. There might also be historical explanations such as differences in political systems where Kenya did not pursue the socialist path and had a different attitude towards and the trust in government. The ethnical composition is different in Kenya and tribal conflicts are more prevalent. In addition, opposed to the traditional Swahili culture, Zanzibar took part in the producing side of the commerce and not only in trading and facilitating. The extensive production of cloves lasted for at least a century and appears to have influenced the institutional structure differently.

All in all Zanzibar has the natural, human and in many ways (at least compared to adjacent areas) institutional potential to succeed in the tourism industry. Demand has until recently increased but the fact that the recent slow-down in tourist visitations is outside national control makes dependency on a single industry a dangerous path to follow. Paper 3 showed that local participation in the industry meant that transition was smoothed and that local people to a larger extent were able to maintain traditional income sources and community stability. This creates resilience to better cope with these types of decreases in visitation rates. One important conclusion is therefore the need to support a heterogenous development of

the industry with a mix of ownership. So far the Government has mainly provided resources to large and foreign investments but equally important is to support the local establishments where local attachment and future investments are secured. This is easier said than done- the very fact that legal systems have evolved under so many systems of foreign dominance makes them (the legal systems) complex and sometimes even contradictory, creating several loopholes for corruptive activities that undermine the ability of the local people to secure their rights. A good understanding of local culture, norms and legal restrictions and how all these interrelate is of the greatest importance for the design of institutions that ensure that the local people get a reasonable share of the proceeds of tourist development, that at least secure but hopefully also improve their welfare.

Concluding remark

Recreational economics have since Harold Hotelling wrote his famous letter to the US National Park Service in 1949[22] made considerable theoretical and empirical advances. But despite half a century of recreational research international long distance tourism has been covered only modestly-despite the fact that international tourism is one of the world's largest industries. The complications created by single-time visitors, the huge number of substitute sites and the fact that the consumers are scattered all over the planet have maybe scared researchers away from this area. The realisation when working with this is, however, that this is not where the real challenge is, although the focus in the literature has been there, i.e. in solving micro details of the demand for recreational services. The great challenge is rather the bigger welfare perspective or that of aggregating benefits or losses over individuals. This is particularly obvious for the export of recreational services from a country characterised by institutional failures, which is typically the case for developing countries, the area of the world where tourism has grown the most. Hopefully it is in this bigger welfare picture that the research in recreational economics will make its advances in the coming half-century.

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[22] This is what laid the foundation to the TCM..

APPENDIX

A. Deriving the expenditure function from an ordinary demand function

The solution can be found by using the duality notion that the utility maximizing point is also the expenditure minimizing point, i.e. $z* = z(p*,Y*) = h(p*,U*)$ where $z*$ maximizes utility at prices $p*$ and income $Y*$ and yields utility $U*$. Then for all prices and by using Sheppards lemma[23] we can write:

$$z[p_z,p_x,e(p_z,p_x,U*)] = h_z(p_z,p_x,U*) = \frac{\partial e(p_z,p_x,U^*)}{\partial p_z}$$

$$X[p_z,p_x,e(p_z,p_x,U*)] = h_x(p_z,p_x,U*) = \frac{\partial e(p_z,p_x,U^*)}{\partial p_x} \tag{A1}$$

The advantages of equation (A1) is that we can derive the expenditure function directly instead of by first identifying the utility. This is done by using the integrability conditions[24] which means that an expenditure function exists such that equation (A1) is satisfied provided that $\partial h(p_z,p_x,U)/\partial p_z$ is symmetric. This is the Frobenius theorem of differential equations which for our problem means that if:

$$\frac{\partial h_z(p_z,p_x,U)}{\partial p_x} = \frac{\partial h_x(p_z,p_x,U)}{\partial p_z} \tag{A2}$$

is true then the demand function can be integrated to find an expenditure function consistent with the observed ordinary demand function. This is in fact the Slutsky equation meaning that when applying the integrability conditions the problem is reduced to requiring that the matrix of substitution terms, i.e.

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[23] See Equation 4 in the main text.

[24] The integrability conditions says that a system of partial differential equations of the form

$$\frac{\partial f(p)}{\partial p_i} = g_i(p) \qquad \textit{i=1,.....k}$$

has a solution if and only if

$$\frac{\partial g_i(p)}{\partial p_j} = \frac{\partial g_j(p)}{\partial p_i} \qquad \text{all } i \text{ and } j$$

$$\frac{\partial z(p_z, p_x, Y)}{\partial p_x} + \frac{\partial z(p_z, p_x, Y)}{\partial Y} \cdot \frac{\partial e(p_z, p_x, U^*)}{\partial p_x} \tag{A3}$$

is symmetric. So with the Slutsky restriction it is possible to integrate the demand function derived from the observed behaviour to find an expenditure function. But it does not end there, because to find out that an expenditure function exists is not sufficient enough to know that a utility function exists. According to Hurwicz and Uzawa (1971), a sufficient condition for $h_z(p_z, p_x, U)$ to result from utility maximization is that the second derivative matrix of $e(p_z, p_x, U)$ is *negative semidefinite,* i.e.

$$\partial h_z(p_z, p_x, U)/\partial p_x = \partial^2 e(p_z, p_x, U)/\partial p_z \partial p_x \tag{A4}$$

which is again the Slutsky matrix.[25] Accordingly, to find a well-behaved expenditure function, i.e. one that is concave in prices, its second derivative matrix has to be negative semidefinite.

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[25] The most intuitive proof of this is that;

$$\frac{\partial h_z(p_z, p_x, U)}{\partial p_x} = \frac{\partial^2 e(p_z, p_x, U)}{\partial p_z \partial p_x} = \frac{\partial^2 e(p_z, p_x, U)}{\partial p_x \partial p_z} = \frac{\partial h_x(p_z, p_x, U)}{\partial p_z}$$

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To Estimate Recreational Welfare Measures for International and Specialised Tourism

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Abstract

A model is developed to estimate recreational welfare measures for access to and changes in quality attributes at long distance single-visit tourist sites with only on-site information available. By defining the good (a visit to the site) as indivisible in consumption, welfare measures are derived by simply capturing or estimating the choke price(s). Stated and revealed methods suitable to derive and estimate choke prices are presented followed by a theoretical discussion of the empirical alternatives and obstacles in using these methods for the scenarios present for long distance recreational decisions.

- There is no such place to take the last journey -

David Livingstone

Introduction

The fact that unique international tourist sites often are consumed (visited) only once by an individual in a given time period[27] and that consumers and substitute sites are randomly scattered all around the world make most traditional valuation techniques difficult or inappropriate to apply for this type of good.

The empirical problems in estimating welfare measures for specialized long distance tourism are mainly caused by the problems of deriving a demand function since the site is single-visited. Revealed preference studies using continuous individual data could overcome this by calculating the dependent variable as the probability of participation, in other words by estimating the rate of participation from a defined area. This creates the next problem that there is no given correlation between distance and price since the same distance to an international site can be travelled at great variation of cost. Attempts have been made to counteract this by dividing the visitors into groups related to individual costs as opposed to geographic origin[28]. Discrete choice models such as the random utility model or the nested logit model provide other alternatives. The problem is how to model the individual's decision process when not only the consumers are scattered around the world but also the target and substitute sites. The activity of identifying substitute sites becomes a major task since the sites are numerous and individually determined. Trekking in Nepal can be a substitute for diving in Australia or visiting Peru or simply going to the cottage in one's own country. It is possible to apply RUM models for *post*-arrival decisions at international sites, i.e. the model is applied for decisions made when already at the site. This is an interesting approach for dealing with multi-site and multi-attraction visitors: typical characteristics of long distance visitors. Riera Font (2000) develops a travel cost model for international tourists based on this two-stage decision process. In the first stage the individual decides where to go and in the second stage what to do while at the site. This means that the decisions of which site to visit and what to do when at the site are made separately. The decision of what to do while at the site is similar to decisions made by residents. Consequently, changes

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[27] In many instances this time period is a lifetime.
[28] See for example Navrud and Mungatana (1994).

in the quality of activities or attractions selected in the second step do not have any impact on the choice of selecting the site in the first step. As the author points out, this is probably best suited to the context of mass tourism and not for specialized or exclusive tourism, which is the focus of this paper. It is more likely that specialized and activity-based tourists make the majority of the multi-attraction/site decisions *before* departing and not while at the site. The site is selected *because* it provides good diving, for example.

Stated preference methods such as the contingent valuation method (CVM), which directly elicits individuals' willingness to pay for quality changes or access can also be applied. Again, the difficulty of identifying the sample remains, since the population is scattered around the world. It is in theory possible to conduct interviews at international airports or in connection with bookings at travel agencies. The most realistic, however, is to conduct an on-site survey, which provides a more accurate representation of the visitors of a particular site otherwise hard to capture on a global scale. Since the intention is to capture the recreational value, i.e. the *use values,* an application of the CVM must be formulated in such a way that use values are separated from possible non-use values. A method proposed in the latter section is to use the cost of the trip as a payment vehicle.

From the discussion above we thus see three main problems with applying conventional valuation techniques on long-distance, international, exclusive tourist sites. Firstly, the sites are single-visited, probably explained by the high fixed costs of both time and money attached to visiting them. Secondly, due to the sample selection problems of international tourists it is more realistic to conduct on-site studies. Lastly, and related to the former points, it is difficult to identify substitute sites since they are individually determined and scattered all around the world, aggravating the use of RUM or nested logit models. As an approximation to reality the good (a visit) is therefore assumed to be *indivisible in consumption* meaning that it is either consumed entirely once, or it is not consumed at all. This means that consumption is neither divided nor repeated. Although this sounds restrictive it very well describes the consumption behaviour of the visitors for these sorts of sites. By starting by defining the good as indivisible in consumption, a matter otherwise empirical, it is possible to

estimate welfare measures by simply capturing the individuals' choke prices, as will be outlined below.

Indivisibility in recreational consumption

The words "consumption" and "good" are used for tourists visiting recreational sites. This is in line with the traditional travel cost approach first developed by Hotelling in 1948 where the cost of going to a site is used as a proxy for the price of visiting that site. To say that a "good" is "a visit to the site" means that all trips are treated as if they were homogenous. It is probably fair to say that the further away and the more exclusive, i.e. the less standardized a trip is, the less homogenous we can expect it to be. The fact that the decision is indivisible in consumption does not mean that the actual trip cannot carry different attributes in the sense that the visitors select different standards of accommodation, stay different number of days at the site or undertake different activities. The decision to go (or not) is indivisible, but given a positive decision the individual selects the attributes of the trip. It is likely that these types of attributes (accommodation, method of transportation) would be similar given the decision to visit a substitute site instead. An individual staying in luxurious hotels and paying extra for a room with a view would probably do this regardless of site. Less obvious is that trips with different numbers of days would be treated as homogenous. The most obvious reason for accepting differences in the number of days at the site is the high fixed cost of getting to the site. Consequently, the marginal cost of staying one extra day is small compared to the price of getting there[29]. One is advised to be careful with samples having large deviations in number of visiting days at the site. It should be pointed out that what is discussed is of an empirical nature since the larger the sample; the more of what is discussed above can be taken into account in the model.

One of the restrictions imposed is that the model should be applicable by only using on-site information. The theoretical model uses the fact that by visiting the site the individual reveals a preference for going to that site, rather than staying at home or visiting any other available site. McConnel et.al. (1999), used a similar approach

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[29] It would be interesting to analyse how the decision of number of days to stay is related to the individual's length of available vacation (countries have different vacation policies) compared to costs.

where they asked the visitors if they would still visit the site if the price were to be increased by a given amount. Inserting the assumption of indivisibility in consumption means that this price, the choke price, is the only additional information of people's preferences that is necessary for welfare estimations of having access to the site.

The model does not provide solutions to some of the topics discussed in the literature despite being of relevance for long-distance tourists. Such topics include how to treat visitors who visit more than one site during the same trip[30]. Multiple site-trips are a common phenomenon for long-distance travellers. Since a restriction in the model is that it is based on on-site information, multiple-site choices are not included in the analysis. It is theoretically possible to use the same model but instead include the choice of adding the target site to the overall trip to capture the marginal cost of going to that site, though this will not be explored further in this paper. The main empirical problem with such an approach is how to estimate the marginal cost. An aspect to remember is that individual travel habits, design of trip and consumer choice situation are highly case-specific and most modelling issues are best adapted to the specific situation of each study. The approach presented in this paper provides a way to deal with international single-site visitors who only visit the site of interest once during the specified time period. Other sorts of tourists, nearby residents for example, can visit the site frequently at low cost, which allows for already existing methods to be applied. Such local tourists would accordingly be dealt with separately in a welfare analysis.

Theoretical Background

The model

Let individuals choose between a number of recreational services where each alternative has a unique combination of price and quality and where the price varies between individuals but quality is site specific. Let $j=0,1,...n$ indicate the recreational opportunities available to the individual, including the alternative to stay at home.

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[30] See for example Smith and Kopp (1980), Bell and Leeworthy (1990), Hof and King (1992), Riera Font (2000)

Define the visit to site z as indivisible in consumption where δ_z indicates the visit to it, $\delta_z = 1$ if the individual visits that site and $\delta_z = 0$ if the individual does not visit it. Further, if δ_k indicates the visit to another site k then $\delta_z \delta_k = 0$ meaning that the sites are mutually exclusive in consumption. The utility of visiting any site j is described in a utility function; $V_j = V(Y^i - \delta_j p^i_j, \delta_j q_j)$, $\forall j = 0,1...n$ where Y^i is individual income, p^i_j individual cost to visit site $j=0,1...n$ and q_j quality at site j. Implicit is a numeraire with price 1.

Accordingly, each individual selects the site that provides the largest benefit; i.e. site z when:

$$V(Y^i - p^i_z, q_z) \geq \max_{j \neq z}\{V_0, V_1...V_n\} \tag{1}$$

For an on-site survey at site z, equation (1) defines the sample selection criterion since only people for whom (1) holds true are observed in the study. It seems realistic to assume that a maximum price exists for visiting site z, such that if the factual price exceeds this price the individual will decide not to go to site z and instead visit the next preferred site. This is the price where:

$$V(Y^i - \tilde{p}_z, q_z) = \max_{j \neq z}\{V_0, V_1...V_n\} \tag{2}$$

The individual will prefer site z as long as the factual price is less than the choke price $\tilde{p}_z$ being the price where the individual is indifferent between going to site z and undertaking the activity rendering the next best utility. The choke price is a function of prices at other sites, quality at the target site as well as other sites and income. It is the main information of relevance for the welfare estimations.

Let us for simplicity's sake assume that the individuals choose between three recreational alternatives[31] **1)** visit site z, which is where the on-site study takes place, **2)** stay at home **3)** visit the (individually selected) next substitute site s. Site z is

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[31] From here on the denotation that price and income are individually determined is taken out.

accordingly the same for all individuals in the sample while the choice of substitute site s differs between individuals.

The individuals' recreational consumption decisions are functions of the utility of taking a trip to the target site z i.e. $V_z = V(Y - p_z, q_z)$, the utility from staying at home, $V_0 = V(Y, q_0)$ [32] and the utility of visiting the individually determined substitute site $V_s = V(Y - p_s, q_s), z \neq s$.

Demand for indivisible goods[33]

By defining the consumption of the trips as indivisible the Marshallian demand function is derived from maximizing $u(x, \delta_z, \delta_s, q)$ [34] s.t. $x + p_z \delta_z + p_s \delta_s \leq Y$, where $\delta_z = 0$ or 1, $\delta_s = 0$ or 1 and x is a numeraire with price one representing an aggregate of "other" market goods and $\delta_z \delta_s = 0$. The Marshallian choke price $\tilde{p}_z^M = p_z^M(p_s, q, Y)$ is implicitly defined as in equation (2) that is:

$$u(Y - \tilde{p}_z^M, 1, 0, q_z) = \max \begin{Bmatrix} u(Y, 0, 0, q_0), \\ u(Y - p_s, 0, 1, q_s) \end{Bmatrix} \tag{3}$$

The ordinary demand functions are thus:

$$\delta_z(p_z, p_s, q, Y) = \begin{cases} 1 & \text{if} & p_z \leq \tilde{p}_z^M \\ 0 & \text{if} & p_z > \tilde{p}_z^M \end{cases}$$

$$x(p_z, p_s, q, Y) = \begin{cases} Y - p_z & \text{if} & p_z \leq \tilde{p}_z^M \\ Y & \text{if} & p_z > \tilde{p}_z^M, V_0 > V_s \\ Y - p_s & \text{if} & p_z > \tilde{p}_z^M, V_0 < V_s \end{cases}$$

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[32] The cost of staying at home is assumed to be zero.
[33] For further reading of indivisibility in consumption see Mäler (1974) pp 131-140.
[34] The indication for quality q is here and in the forthcoming text a vector of q_z, q_s and q_0.

$$\delta_s(p_z, p_s, q, Y) = \begin{cases} 0 & \text{if} \quad p_z \leq \tilde{p}_z^M \text{ or } p_z \leq \tilde{p}_z^M, V_0 > V_s \\ 1 & \text{if} \quad p_z > \tilde{p}_z^M, \ V_0 < V_s \end{cases}$$

Demand for visiting site z and for the numeraire is illustrated in Graph 1. In the case of the numeraire it is illustrated such that $V_0 > V_s$ i.e. the individual prefers staying at home when switching away from site z (and not visiting site s).

Graph 1. The Marshallian demand for visiting site z and for the numeraire. The demand illustrated for the numeraire assumes that the individual prefers staying at home rather than visiting a substitute site when exiting the market for z.

The compensated demand is derived by minimizing the objective function $x + p_z \delta_z + p_s \delta_s$ s.t. $u(x, \delta_z, \delta_s, q) \geq \bar{u}$ where again $\delta_z = 0$ or 1, $\delta_s = 0$ or 1 and x is a numeraire with price one. If we assume that the individual visits site z and the reference utility is $\bar{u} = u(x, 1, 0, q_z)$, then $x_z(q_z, \bar{u})$ indicates the compensated demand for the numeraire. This can also be written as the inverse of $u(x, \delta_z, \delta_s, q)$ with respect to the first argument i.e.: $x_z(q_z, \bar{u}) = u^{-1}(\bar{u} \mid 1, 0, q)$. Using these denotations the maximum willingness to pay to visit site z, $\tilde{p}(\bar{u})$, is defined as:

$$x_z(q_z,\bar{u}) + \tilde{p}(\bar{u}) = \min \begin{cases} x_s(q_s,\bar{u}) + p_s \\ x_0(q_0,\bar{u}) \end{cases} \tag{4}$$

The $\tilde{p}(\bar{u})$, in the forthcoming text referred to as the maximum compensation, has a different meaning compared to the Marshallian choke price defined in equation (3) but as the subsequent text will show they sometimes coincide.

The expenditure, conditional on the above given reference utility is then; $e_z = x_z(q_z,\bar{u}) + p_z$. Using a similar denotation the minimization generates the following unconditional compensated demand functions:

$$\delta_z^H(p_z, p_s, q, \bar{u}) = \begin{cases} 1 & \text{if} \quad x_z(q_z,\bar{u}) + p_z \leq \min \begin{cases} x_s(q_s,\bar{u}) + p_s \\ x_0(q_0,\bar{u}) \end{cases} \\ 0 & \text{otherwise} \end{cases}$$

$$x^H(p_z, p_s, q, \bar{u}) = \begin{cases} x_z(q_z,\bar{u}) & \text{if} \quad x_z(q_z,\bar{u}) + p_z \leq \min \begin{cases} x_s(q_s,\bar{u}) + p_s \\ x_0(q_0,\bar{u}) \end{cases} \\ x_0(q_0,\bar{u}) & \text{if} \quad x_0(q_0,\bar{u}) \leq \min \begin{cases} x_z(q_z,\bar{u}) + p_z \\ x_s(q_s,\bar{u}) + p_s \end{cases} \\ x_s(q_s,\bar{u}) & \text{otherwise} \end{cases}$$

$$\delta_s^H(p_z, p_s, q, \bar{u}) = \begin{cases} 1 & \text{if} \quad x_s(q_s,\bar{u}) + p_s \leq \min \begin{cases} x_z(q_z,\bar{u}) + p_z \\ x_0(q_0,\bar{u}) \end{cases} \\ 0 & \text{otherwise} \end{cases}$$

The Hicksian demand for site z has the same shape as the Marshallian demand illustrated in Graph 1, with the exception that it is limited by the maximum compensation defined in equation (4). Since the maximum compensation is a function of utility it will depend on the reference utility attained. Similarly, the demand for the numeraire will depend on the reference utility as well as the change that will take

place. The relationship between the maximum compensation and the Marshallian choke price defined in equation (2) accordingly depends on the relation between the individual's factual price and choke price, before and after any change. As mentioned, the price level that induces the individual to switch sites is what is used for the welfare estimations thereby justifying this preoccupation with the maximum compensation and the choke price. The implication for the welfare measures being dependent on how the choke price is derived is analysed for different scenarios that are present for specialized international tourism. Before that some alternative methods for deriving the choke price are presented.

Estimation methods

A revealed preference method for deriving the choke price

Let us first consider the alternative of using revealed preference (RP) methods for capturing the choke price. Remember that the only information revealed from an on-site study is people's actual cost of visiting the site, i.e. the actual price of the good. This price differs between individuals. Assume a simple scenario where $\tilde{p}_z$ is a function of prices at other sites and of quality at site z as well as other sites. Assume, to start with, that all individuals have the same income. Also assume that individuals included in the sample have identical preferences. Given these assumptions and given that the on-site sample is large enough, the estimated choke price is simply equal to, or almost equal to, the price paid by the individual paying the highest price.

Denoting A, the set of all individuals included in the sample from the target site z and p^i the price paid by the respective individual in the sample, the choke price to visit site z is;

$$\tilde{p}_z(p_s, q) = \sup\{p^i, \forall i \in A\} \tag{5}$$

Consequently, the fact that individuals travel to the same site but for different prices allows us to estimate the choke price by simply observing the individuals' behaviour despite the site only being visited once. The restrictions for all individuals being identical and everybody having the same income are stringent. Let's relax the

assumption that all individuals have equal incomes and assume that the individuals in the set can be grouped into different income intervals. Set g=numbers of income groups and $A = \bigcup_{m \in 1}^{g} A_m$ where $A_m \cap A_l = \emptyset$, $\forall m, l$, $m \neq l$ since each individual is included in an income group but never in more than one group. Then apply the same method described for the non-income case but for each group i.e.:

$$\tilde{p}_m(p_s, q_z, Y_m) = \sup\{p^i; i \in A_m\}; \ m = 1...g \tag{6}$$

This means that all individuals in the same income group will have the same choke price and each group's choke price is equal to the price paid by the individual paying the highest price in the respective group. In terms of income affecting the decision of where to travel, disposable income might not be the decisive variable. Recreation could possibly be consumed from a special "travel budget" meaning that individuals have saved for a longer time period to be able to undertake these sorts of trips. If this sort of information was available, the "travel budget" could be separated from the consumption of other goods and discounted over time[35]. Another possibility is that the choke price is function of a variable other than income or in combination with income. If what is valued is a resource used for a special interest, some aspect of this interest might play a very large role in determining the individual's choke price. Divers are for example willing to pay large amounts of money and travel great distances to carry out their sport (Davis and Tisdell 1996, Andersson, 2004). Thus the magnitude of the interest might play a larger role than income for the level of the choke price. If this is identified to be the case the groups can be designed based on this relation.

What can be said in general about the RP estimate of the choke price is that it is biased downward and that the magnitude of this bias is negatively related to the size

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[35] It would result in a budget: $\sum_\tau \dfrac{Y_\tau}{(1 + r_\tau)^\tau} = \sum_\tau \left(\dfrac{Y_\tau^{non\,recreational\,goods}}{(1 + r_\tau)^\tau} + \dfrac{Y_\tau^{recreational\,goods}}{(1 + r_\tau)^\tau} \right)$

of the sample[36]. Consequently, the more income groups (or other sorts of groups) created, the larger the sample required. It is also likely to be related to the distribution of the individual incomes in the sample. The more evenly distributed the number of individuals in each income group, the more accurate the result[37].

Eliciting information about the individual's preferred alternative when exiting the market for site z is not possible using this type of revealed preference method. This means that there will be no information of the individual's preferred substitute site unless a questionnaire is administered.

A stated preference method to derive the choke price

Using the stated preference (SP) method means that the choke price is elicited directly from the on-site visitors using anything from a discrete choice or open-ended Contingent Valuation Method (CVM) question. Regardless of questioning mode, eliciting stated preferences requires that a questionnaire is administered to each individual or alternatively that telephone interviews are collected after the visit[38]. The visitors are in some form asked to state the price level that would induce them to change their decision to go to site z and instead stay at home/visit a substitute site[39]. It is in practice possible to elicit a compensated welfare estimate directly using an SP method.

An additional question in the questionnaire can readily collect information about substitute sites. The fact that the survey is conducted on-site, however, means that the response is based on actual experience of the site while the individual has no experience of the substitute site given the single-visit assumption. The decision to

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[36] The following proof can be presented: Assume an income group A_m where in accordance with equation (6) $\tilde{p}_m$ equals the price paid by the individual paying the highest price in group m. Then assume that one more individual is included in the sample. This individual can increase the choke price but never decrease it.

[37] If, for example, higher income groups are less represented, the fact that the chokeprice is negatively related to the size of the group might result in their chokeprice being lower than lower income groups that are much better represented.

[38] Telephone interviews might be a bit cumbersome considering that people come from all over the world.

[39] McConnel et al (1999) used a double bounded dichotomous choice question where they asked the visitors if they would still visit the site if the price increased by X. If the individual said yes they asked the individual if he/she would still come if the price was increased by X+ΔX.

switch to site *s* is thus in reality not based on equal information about the trade-off between site *z* and the substitute site *s*.

Since stated information can deal with hypothetical changes in quality, the value of quality changes can be estimated by simply describing the changed scenario and asking the respondents to state their maximum payment level.

Since the RP derives its estimate from decisions made at home, it is based on expectations of the site and not on perfect information. In a situation where the individual is "disappointed" with the recreational service, this disutility will not be revealed. The risk for this sort of bias is study-specific and is probably best dealt with uniquely for each case. The SP method is equipped to capture these sorts of "disappointments" since the individual is able to state a choke price below the factual price of the visit to the site resulting in a zero welfare estimate. Consequently, the estimate derived with the RP method is based on the individual's decision before visiting the site while the SP response is based on having experienced the site.

Are there situations where the RP method is more appropriate than the SP method and vice versa? The main difference seems to be the availability of data. The RP requires a large sample to arrive at a reliable estimate for the choke price. If sample size is easily accessible an RP study is probably less expensive compared to an SP study that requires a questionnaire being administered and personal interviews taking place. On the other hand, an SP study requires a smaller sample. In terms of estimating the value of a quality change the RP method is not able to do this without additional information. Only if two identical sites with different quality levels are compared, or if the choke prices for the same site at two different time periods are compared, can a measure for the value of a change in an attribute be estimated. Further pros and cons of the respective methods will be discussed below in relation to the different values and situations that might arise.

Estimating welfare measures[40]

Four different scenarios are identified to together depict the full picture of the behaviour of non-participants, potential participants and actual participants for

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[40] Useful reading for welfare estimations of these types are Mäler (1974), Hanemann (1984, 1999a, 1999b), Small and Rosen (1981), Bockstael and McConnel (1993).

changes in price and quality at the international (exclusive) single visited site z.
Throughout the welfare estimation, weak complementarity is applied as a restriction
on the consumer preferences. Since the value of interest for the welfare estimations
are only use-values this assumption is considered fully realistic.

First the possible reference utilities need to be identified. The reference utility
depends on the relation between the factual cost of the trip and the individual choke
price providing two alternative scenarios;

1) $p_z \geq \tilde{p}_z$ and $\bar{u}^0 = \max\{u(Y - p_s, 0, 1, q), u(Y, 0, 0, q)\}$

2) $p_z \leq \tilde{p}_z$ and $\bar{u}^1 = u(Y - p_z, 1, 0, q)$

The first alternative implies a person who is not at the site and the second a person
who is. If a change in price or quality induces the person to enter the market a welfare
change takes place. The problem is how to describe the individual's change of mind
since it is assumed that the site is only visited once. It is unlikely that an individual
who is at the site (on the one and only visit to the site) decides to exit the market due
to changes in an attribute. One can imagine that the individual has made/not made the
decision to… and not that the individual is/is not at the site. This provides a more
realistic decision situation.

Four different changes in p_z and q_z result in a change in recreational welfare.
These can be divided into two groups incurring the same sign on utility:

a) $p_z \uparrow$ or $q_z \downarrow \Rightarrow u \downarrow$

b) $p_z \downarrow$ or $q_z \uparrow \Rightarrow u \uparrow$.

Combining 1 and 2 with a and b creates four different scenarios. Note that
group 2 represents the on-site individuals while those in group 1 are potential
participants that might enter the consumption of site z due to changes in price and
quality. The theoretical restrictions imposed on the empirical applicability of the
model is outlined below given on-site data. First the four scenarios are applied for

price changes. Next the value for having access to site z is estimated followed by the welfare result of a quality change at the site.

The welfare effects of a price change

Thus, scenarios *1a* and *2a* depict a price *increase* and scenarios *1b* and *2b* depict a price *decrease*. In both cases a uniform change is assumed meaning that the price is changed by the same amount for all individuals. This could, for example, be a situation where all flight prices increase at an equal rate due to, perhaps, higher oil prices. In situations where only a certain section in the sample is affected by the price change and the RP method is applied the choke price can be estimated from the part of the sample that is affected by the change using equation (6). In the presentation below the assumption is however a *uniform* price change.

Let p_z^0 and p_z^1 represent two prices at site z where p_z^0 is always the initial price and p_z^1 the price after the change. The compensated variation (CV) [41] of a price change is defined as:

$$CV = e(p_z^0, p_s, q_z, \bar{u}) - e(p_z^1, p_s, q_z, \bar{u}) \tag{8}$$

Note that individuals have different actual prices as well as different choke prices. The exception is the special case where the choke price is estimated assuming that all individuals have identical preferences such as in equation (5). In the first scenario *1a)* where $p_z^0 > \tilde{p}_z$ and $p_z \uparrow$ there will be no welfare effect since people will simply be even less attracted to visiting the site. For scenario *1b)* where $p_z^0 > \tilde{p}_z$ but $p_z \downarrow$ there are two alternatives. If $p_z^1 > \tilde{p}_z$ there will be no welfare effect, but if $p_z^1 < \tilde{p}_z$, non-participants will be induced to enter consumption of good z.

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[41] The compensated variation is delineated here but the equivalent variation (EV) could be analogously estimated given that the "new" utility level is used as a reference point in the different scenarios. The CV will for consistency be used throughout the text.

Thus, if $\bar{u}^{0_0}$ and $\bar{u}^{0_s}$ indicates the individual's initial utility meaning that the original decision was to stay at home respectively to visit site s, equation (8) can be rewritten:

$$CV_{p_z\downarrow} = x_0(q_0,\bar{u}^{0_0}) - x_z(q_z,\bar{u}^{0_0}) - p_z^1$$

or

$$CV_{p_z\downarrow} = x_s(q_s,\bar{u}^{0_s}) + p_s - x_z(q_z,\bar{u}^{0_s}) - p_z^1$$

(9)

Since $x_0(q_0,\bar{u}^{0_0}) = Y$ and $x_s(q_s,\bar{u}^{0_s}) = Y - p_s$ equation (9) yields;

$$CV_{p_z\downarrow} = Y - p_z^1 - x_z(q_z,\bar{u}^{0_0})$$

or

$$CV_{p_z\downarrow} = Y - p_z^1 - x_z(q_z,\bar{u}^{0_s})$$

(10)

For simplicity of presentation let us denote $\bar{u}^{0_0}$ and $\bar{u}^{0_s} = \bar{u}^0$. From the definition of the maximum compensation in equation (4) we know that;

$x_z(q_z,\bar{u}^0) = Y - \tilde{p}_z(\bar{u}^0)$ and the welfare measure in equation (10) becomes;

$$CV_{p\downarrow} = \tilde{p}_z(\bar{u}^0) - p_z^1$$

(11)

This maximum compensation in (11) is theoretically identical to the Marshallian choke price (see proof in Appendix).

What does this mean empirically? The on-site sample does not contain information about the price at which non-participants will switch consumption. In addition, to be able to estimate an aggregate welfare measure for this group, the number of individuals entering the consumption of site z needs to be identified. In sum, the number of non-participants with $p_z^1 < \tilde{p}_z$ and their respective choke price levels need to be identified.

In scenario *2a)* where $p_z < \tilde{p}_z$ and $p_z \uparrow$ two alternative outcomes might take place. If $p_z^1 > \tilde{p}_z$, the individual will switch recreational sites and the welfare measure is defined as:

$$CV_{p_z\uparrow} = \min \begin{cases} Y - x_0(q_z,\bar{u}^1) \\ Y - p_s - x_s(q_z,\bar{u}^1) \end{cases} \tag{12}$$

The last terms in the respective equations in (12) are unknown. By inserting the definition of the maximum compensation in equation (4) the estimate is equal to $CV = p_z^0 - \tilde{p}_z(\bar{u}^1)$. The maximum compensation is in this situation *not* identical to the Marshallian choke price. The maximum compensation defines the price level where the individual is indifferent to being or not being at the site, keeping utility constant, in this case the utility of being at the site and having paid the actual price.

Stated preference methods[42] can capture this value by asking the individuals at the site (who have paid p_z^0 to get there) to state the amount they would require in compensation for being asked to leave the site. This type of question seems somewhat odd. The Marshallian choke price is the price where the individual is indifferent to going to the site or not as defined in equation (2). Thus:

$$w\Delta = p_z^0 - \tilde{p}_z^M \tag{13}$$

A stated preference survey can acquire this price level by asking the individuals to state the price that would induce them to switch sites. This seems to be a more intuitive question to respond to. The welfare loss from the increase in price is then equal to equation (13), which is the consumer surplus (CS).

In the revealed preference case the Marshallian choke price is estimated as in equation (5) and (6). The choke price estimate is then inserted in equation (13).

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[42] Here we ignore inherent biases and other doubts connected to the use of stated preference method. This does not at all imply that they are considered irrelevant, but that they are better discussed in another forum.

In the case where $p_z^1 < \tilde{p}_z$, the individual will not switch sites but experiences a welfare loss[43]. This welfare loss is thus:

$$CV_{p_z\uparrow} = p_z^0 - p_z^1 \tag{14}$$

The aggregate value is simply the estimate in equation (14) multiplied by the number of visitors with $p_z^1 < \tilde{p}_z$.

Lastly, scenario *2b)* where $p_z < \tilde{p}_z$ and $p_z \downarrow$ implies that the individual will not switch sites but experience a welfare gain. This welfare measure is identical to expression (14) but with opposite signs compared to the result in scenario *2a*.

In conclusion, for individuals with a choke price above their factual price the choke price defined in equation (2) can be estimated using either the revealed or stated preference method. Based on this estimate of the choke price, the individuals who will switch sites can be identified and their welfare measure estimated from equation (13). Those who will stay but experience a utility decrease can similarly be identified and the welfare measures can be estimated from equation (14).

The value of having access to site z

It is common to estimate the value of having access to the site in recreational valuation studies. The compensated variation for access (CV_a) is defined as:

$$CV_a = e(\tilde{p}_z, p_s, q, \bar{u}) - e(p_z^{'}, p_s, q, \bar{u}) \tag{15}$$

where $p_z^{'}$ denotes the individuals actual price of visiting the site. Assuming that non-participants have zero WTP for access, non-participants described in scenario *1a* and *1b* above do not need to be considered. The assumption seems plausible since the estimation only includes use-values.

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[43] From $CV_{p_z\uparrow} = u^{-1}(\bar{u}^1 | 1,0,q) + p_z^0 - u^{-1}(\bar{u}^1 | 1,0,q) - p_z^1$

Inserting the expenditure functions as defined in (4) into equation (15) thus results in:

$$CV_a = \tilde{p}_z(\overline{u}^1) - p_z^{'} \tag{16}$$

We now face the same situation as above where the maximum compensation and the choke price in theory are not identical. For an on-site SP study that wants to capture the value in (16), the interviewer at the site then needs to ask something along the lines of "*what would you require in compensation if you were asked to leave the site?*" In contrast, an individual who is not at the site but is on the way there (because $p_z^{'} < \tilde{p}_z$ since otherwise $CV_a = 0$), would respond to, "*what would you require in compensation if you were denied access to the site?*" Using the Marshallian choke price the welfare measure is defined in the same way as (16) except for the choke prices, thus:

$$CV_a = \tilde{p}_z^M - p_z^{'} \tag{17}$$

This measure can also be captured directly in a stated preference question by requesting the individual to state the price where the trip would not have been bought or how much more the individual is willing to pay before choosing not to go. If this stated cost is added to the factual price the Marshallian choke price is acquired, defined as the price where the individual is indifferent to going to the site and or doing the next preferred activity.

Similarly, revealed preference can be used to derive the choke price as described before. The individual's factual price is then simply subtracted from the estimated chokeprice. To aggregate, the result is added over individuals visiting the site.

The value of a change in quality at site z

Let us consider a discrete change in quality at site *z*. Assume that the individual has full information about the quality of the site and all other substitute

sites before making the decision to visit site z. This simply means that for the people in the sample the choke price remains above the factual price ($p_z^{'} \le \tilde{p}_z$) also after experiencing the site, i.e. expectations fit reality and there are no "surprises" at arrival[44]. This assumption is more relevant for the RP method since the SP method in principal can capture the estimate of a choke price that is below the actual price; the individual would not have participated given the quality level discovered at arrival. As was discussed earlier, the individual does not have equal information about the target site and the substitute site given the assumption of indivisibility in consumption since the individual has experienced site z but not site s. This accordingly results in biased information for the SP method also.

Assume that the initial quality at site z, $q_z = q_z^0$ changes to a new quality level $q_z = q_z^1$. The welfare measure for this quality change (CV$_q$) is defined as:

$$CV_q = e(p_z, q_z^0, \bar{u}) - e(p_z, q_z^1, \bar{u})$$
(18)

As earlier, the assumption of weak complementarity between visiting the site and site quality is assumed[45]. The main difference for a quality change compared to a price change is that the choke price is a function of site quality. This means that, given that all other variables are fixed, the change in q_z will alter the individual's choke price for visiting site z. Consequently, welfare estimates for changes in quality will involve the estimation of the additional choke price for the new quality level, $q_z = q_z^1$. The fact that there are two quality levels and that utility is a function of quality means that there are additional reference utility levels to consider. Denote $\bar{u}_{q^0}^1$ to be the reference utility level attained at $\delta_z = 1$ and $q_z = q_z^0$ and equivalently $\bar{u}_{q^1}^1$ the reference utility

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[44] The model can theoretically be extended to include expectations, but the discussion here is confined to a situation of perfect information.

[45] This implies that when $\delta_z = 0$ then:

$$\frac{\partial u(Y, 0, 0, q)}{\partial q_z} = 0 \text{ and } \frac{\partial u(Y - p_s, 0, 1, q)}{\partial q_z} = 0.$$

attained at $\delta_z = 1$ and $q_z = q_z^1$. The weak complementarity assumption reduces the increased number of reference utilities by cancelling out some terms. For example:

$$x_s(q_z^0, \overline{u}_{q0}^0) = x_s(q_z^1, \overline{u}_{q0}^0) = x_s(q_z^0, \overline{u}_{q1}^0) = x_s(q_z^1, \overline{u}_{q1}^0) = y - p_s \qquad (19)$$

Equivalently, $x_0(q_z, \overline{u}) = Y$ despite changes in quality or choice of quality reference level for individuals where $V_0 > V_s$.

Let us repeat scenarios *1a-2b* for a discrete change in quality at site z including the above assumptions and that all other variables remain fixed.

In *1a)* $p_z > \tilde{p}_z^{q0}$ and $q_z \downarrow$. Given the weak complementarity condition this scenario will not result in any conditional welfare effect for a change in quality at site z.

In scenario *1b)* where $p_z > \tilde{p}_z^{q0}$ and $q_z \uparrow$ there are two possible outcomes. If $p_z > \tilde{p}_z^{q1}$ the result is similar to above with zero welfare effect due to the weak complementarity assumption. On the other hand, if $p_z < \tilde{p}_z^{q1}$ non-participants are induced to enter the market. Applying equation (16) for this situation gives a similar result to the price change in equation (10):

$$CV_{q\uparrow} = Y - p_z - x_z(q_z^1, \overline{u}_{q0}^{0s})$$

or $\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad (20)$

$$CV_{q\uparrow} = Y - p_z - x_z(q_z^1, \overline{u}_{q0}^{0o})$$

From the definition of the maximum compensation in equation (4) and the weak complementarity condition the respective last terms in (20) equal $Y - \tilde{p}_z^{q1}(\overline{u}_{q0}^{0s})$ and $Y - \tilde{p}_z^{q1}(\overline{u}_{q0}^{0o})$. Analogous to the case of a price decrease, the welfare measure is thus:

$$CV_{q\uparrow} = \tilde{p}_z^{q1}(\overline{u}_{q0}^0) - p_z \qquad (21)$$

and where the maximum compensation is either $\tilde{p}_z^{q1}(\overline{u}_{q0}^{0_s})$ or $\tilde{p}_z^{q1}(\overline{u}_{q0}^{0_0})$ depending on the individual's reference activity. Analogous to the price change, the maximum compensation and Marshallian choke prices are identical here.
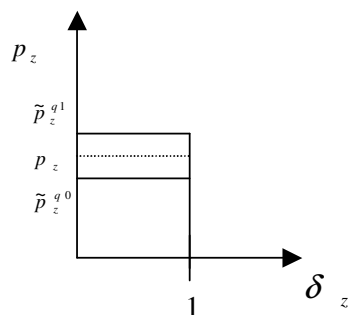
Graph 2. The shift of the demand curve when quality increases as described in 1b) ii).

Only the SP method can capture these values since the on-site users can be asked to state their choke price or required compensation for a hypothetical discrete increase in quality. As discussed earlier, it is not easy to infer these estimates on non-participants since the SP method does not assume identical preferences. With a large enough sample, however, it would be possible to infer estimates for different groups included in the sample that could then be identified as potential consumers.

From a single on-site study the RP method cannot derive measures for quality changes because the estimate for the choke price in (5) and (6) does not contain any information about people's preferences for quality. The only situation when a RP study is applicable is if an *ex ante* and *ex post* quality change study is conducted at the same site. Alternatively if two sites with different quality levels but otherwise identical are both surveyed the value for quality can be captured using the RP method.

Next, *2a)* where $p_z < \tilde{p}_z^{q0}$ and $q_z \downarrow$ also has two possible scenarios. If $p_z > \tilde{p}_z^{q1}$ the individual will change his mind and not visit site *z*. Applying equation (16) on the group exiting the market:

$$CV_{q\downarrow} = \min \begin{cases} Y - x_0(q_z^1, \bar{u}_{q0}^1) \\ Y - p_s - x_s(q_z^1, \bar{u}_{q0}^1) \end{cases} \tag{22}$$

Similarly to the previous scenario the last two terms are unknown. By inserting the definition of the maximum compensation from equation (4) and applying the weak complementarity condition this equal:

$$CV_{q\downarrow} = p_z - \tilde{p}_z^{q0}(\bar{u}_{q0}^1). \tag{23}$$

The maximum compensation is *not* identical to the Marshallian choke price. The compensated price defines the price where the individual is compensated for exiting the site keeping utility constant, in this case the utility of being at the site and having paid the actual price at the original quality level.

If instead $p_z < \tilde{p}_z^{q1}$ the individual will remain with the decision to visit site z but will experience a welfare loss:

$$CV_{q\downarrow} = x_z(q_z^0, \bar{u}_{q0}^1) - x_z(q_z^1, \bar{u}_{q0}^1) \tag{24}$$

Inserting the definition of the maximum compensation in (4):

$$CV_{q\downarrow} = \tilde{p}_z^{q1}(u_{q0}^1) - \tilde{p}_z^{q0}(u_{q0}^1) \tag{25}$$

In words this is the difference in the respective compensation required for exiting the site for the different quality levels. Formulating this into a stated preference question would be very awkward. The underlying reason being that the consumer has finished or is just beginning his one and only consumption of the good. The stated preference method is more useful in capturing the respective choke prices defined in equation (2) asking the individuals to state the price where they will exit the market for z. The welfare estimate for this sort of question is thus defined as:

$$w\Delta = u(Y - p_z, q_z^0) - u(Y - p_z, q_z^1) \tag{26}$$

which after some manipulation result in[46];

$$w\Delta = \tilde{p}_z^{q1} - \tilde{p}_z^{q0} \tag{27}$$

which are the respective Marshallian chokeprices. As mentioned in the previous scenario only the SP method can be applied since it can elicit the value for a hypothetical quality change. In order to use the RP method an *ex post* study has to be conducted.

For scenario *2b)* where $p_z < \tilde{p}_z^{q0}$ and $q_z \uparrow$ the individual will not switch consumption but will experience a welfare gain. This welfare measure is identical to the expression in (25) and (27), but with opposite signs compared to scenario *2a*.

An issue to consider is the potential income effects. Unless the CV_a is very large, the income effect is likely to be small but present nevertheless. For a sample where the income is known this can be tested. What is of concern is how large $p_z' - \tilde{p}_z$ is in relation to income. If small, it is possible to assume that the marginal utility of consumption is constant and the change in quality does not affect the marginal utility of income.

The path dependency problem that might occur when the price of the commodity is used as a payment vehicle to elicit welfare measures is not presented here. The underlying reason for this problem is that the question format causes a simultaneous change in both price and quality. For this model it is not a problem since consumption is fixed given the indivisibility condition.[47]

$$\begin{aligned}
w\Delta = &\, u(Y - p_z, q_z^0) - u(Y - \tilde{p}_z, q_z^0) - u(Y - \tilde{p}_z, q_z^0) - \\
&\, -u(Y - p_z, q_z^1) - u(Y - \tilde{p}_z, q_z^1) - u(Y - \tilde{p}_z, q_z^1) = \\
&\, = (p_z - \tilde{p}_z^0) - (p_z - \tilde{p}_z^1) \\
&\, = \tilde{p}_z^1 - \tilde{p}_z^0
\end{aligned}$$

[46]

[47] For further readings in this subject consult Johansson (1996).

Conclusions

This paper assesses the possibility of defining long-distance and specialized recreation as indivisible in consumption as a mean to estimate welfare measures for this type of tourism. Assessments of welfare estimations for all scenarios and welfare changes identified for this market are undertaken, mainly to identify the empirical and theoretical constraints caused by the invoked assumptions. The assumptions invoked are that only on-site information is available and that the good is defined as indivisible in consumption.

As a general conclusion, the fact that information by assumption is restricted to on-site data is a limitation only in the case of a price decrease and quality increase since then non-participants might enter. In the case of a price decrease the RP method outlined in the paper can capture the value by assuming that all individuals have identical preferences. This is not possible for a quality change since the derived choke price does not contain any information about the visitors' preferences for quality. When valuing access of the site these restrictions do not cause any problems. The reason for this is the assumption that individuals not included in the sample have zero willingness to pay (since we are only estimating use values).

In line with what was stated above SP methods are superior when valuing quality changes since they can make estimates of hypothetical changes that RP methods cannot. The RP method can only be applied given that there is *ex ante* and *ex post* information for the same site. Alternatively a value for quality can be captured if there is information from two different sites that are identical but with different quality levels.

Using the price of the trip as the payment vehicle means that useful policy relevant information about choke prices is captured. It was also found that due to the indivisibility in consumption situation, SP questions were awkward to pose and that it made more sense to ask the individuals to directly state their individual chokeprice.

The fact that the model can be extended to estimate the value of changes of attributes also makes it suitable for the estimation of welfare measures of natural, cultural and social recreational services. The empirical limitation is lack of information and this occurs when the change causes the individual to switch site.

APPENDIX

In scenario *1)* $p_z \geq \tilde{p}_z$ i.e. $\bar{u}^0 = \max\{u(Y - p_s, 0, 1, q), u(Y, 0, 0, q)\}$ the individual is not at the site and the inverse of the respective utility functions are then:

$$u^{-1}(\bar{u}^{0_s} | 0, 1, q) = Y - p_s \tag{A1}$$

or

$$u^{-1}(\bar{u}^{0_0} | 0, 0, q) = Y \tag{A2}$$

Substituting (A1) and (A2) respectively into the following definition of the maximum compensation[48]:

$$\tilde{p}_z(p_s, q, \bar{u}^{0_s}) = p_s + u^{-1}(\bar{u}^{0_s} | 0, 1, q) - u^{-1}(\bar{u}^{0_s} | 1, 0, q) \qquad if \qquad V_0 < V_s \tag{A3}$$

or

$$\tilde{p}_z(p_s, q, \bar{u}^{0_0}) = u^{-1}(\bar{u}^{0_0} | 0, 0, q) - u^{-1}(\bar{u}^{0_0} | 1, 0, q) \qquad if \qquad V_0 > V_s \tag{A4}$$

this yields:

$$\tilde{p}_z(p_s, q, \bar{u}^{0_s}) = Y - u^{-1}(\bar{u}^{0_s} | 1, 0, q) \tag{A5}$$

or

$$\tilde{p}_z(p_s, q, \bar{u}^{0_0}) = Y - u^{-1}(\bar{u}^{0_0} | 1, 0, q) \tag{A6}$$

Equation (A1) and (A5) together and (A2) and (A6) together imply that:

$$u(Y - \tilde{p}_z, 1, 0, q) = \max\begin{Bmatrix} u(Y - p_s, 0, 1, q) \\ u(Y, 0, 0, q) \end{Bmatrix} \tag{A7}$$

Which is identical to the definition of the Marshallian chokeprice defined in equation (4) in the main text. Consequently, $\tilde{p}_z(\bar{u}^0) = \tilde{p}_z^M$ and the ordinary and compensated demand curves are identical. This is when $\delta_z = 0$ in the reference utility. In alternative *2)* $p_z \leq \tilde{p}_z$ and the reference utility

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[48] This definition is derived from the fact that $x_z(q_z, \bar{u}) + \tilde{p}_z^H = x_s(q_s, \bar{u}) + p_s$

$\bar{u}^1 = u(Y - p_z, 1, 0, q)$ which means that the individual has decided to visit site z. The situation looks different here because then:

$$u^{-1}(\bar{u}^1 | 1, 0, q) = Y - p_z'$$ (A8)

Where p' indicates the actual price of visiting site z. Then the chokeprice in (A3) can be written as:

$$\tilde{p}_z^H = p_z' - Y + p_s + u^{-1}(\bar{u} | 0, 1, q)$$ (A9)

and accordingly $\tilde{p}_z^H \neq \tilde{p}_z^M$. The exception is if the utility function has the quasi-linear form. Hanemann (1999a) shows that $\tilde{p}_z^H = \tilde{p}_z^M$ independently of (p_z', p_s, q, Y) if and only if this is the case[49].

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[49] See proof of proposition in Hanemann (1999a) Appendix pp. 62-63.

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Paper 2

The Recreational Cost of Coral Bleaching - a Stated and Revealed Preference Study of International Tourists

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Abstract

The welfare loss of *de facto* ecological damage at an internationally visited recreational site was estimated by comparing stated preference information from before and after the actual change in quality occurred. Estimates for access to the site and for access to coral reefs before and after coral bleaching and mortality hit the Western Indian Ocean in 1998 were derived using the cost of the trip as a payment vehicle. The model assumes that these sorts of trips are indivisible in consumption. It was found that despite losses in utility due to bleaching the tourists still visited the sites.

Introduction

Nature-based and outdoor recreation, including activities such as diving and snorkelling are becoming increasingly popular. While diving certificates are being issues at an exponential rate, coral reefs, a major attraction for divers and snorkellers, are steadily suffering from human impact and natural catastrophes. The latest major event, which coincided with *El niño* in 1997/1998, caused widespread coral bleaching and mortality in tropical waters all around the world. One of the affected areas was the West Indian Ocean where the event was reported to be one of the most serious natural catastrophes ever. In this paper the recreational welfare loss caused by this event is studied on two islands, Zanzibar and Mafia, typically visited for their pristine coral reefs, situated outside Tanzania in the West Indian Ocean.

An on-site study estimating the value of access and the value of quality changes of the reefs *before* the bleaching event was copied and redone *after* bleaching had occurred. The survey applied stated preference questions using the cost of the trip as a payment vehicle. The welfare loss of the *de facto* ecological damage is estimated by comparing stated preference information from before and after the actual change. This compares with a "natural experiment" measuring the value of an actual unit of change. In addition, the fact that a real quality change takes place permits the simultaneous use of revealed preferences measuring the value of the same quality change, which is otherwise not possible given only on-site information.

Biological assessments of the reefs at the two sites documented radical changes in coral coverage after the bleaching where coral cover at monitoring sites in Mafia decreased from 73% to 19% and in Zanzibar from 46% to 32% between 1997 and 1999 (Obura, 2002). The number of fish, on the other hand, was documented as remaining the same and even increasing (Bergman and Öhman, 2001). But while the number of fish remained the same or increased, the composition had changed to more herbivore species and fewer coral reef fish (Mohammed *et. al.* 2002). Coral reef fish are in general more colourful and spectacular compared to herbivore fish.

The visitation data seem to be more sensitive to external factors such as political instability and epidemic outbreaks rather than the natural catastrophe of coral

bleaching. There was a cholera outbreak during the same period as the bleaching which was well covered by the media in Europe and supposedly would contribute to the slowdown of the increase in visitation rate. Similar non-decreasing figures from bleaching were found in other areas in the region. The Maldives, a well-known diving destination also severely affected by the bleaching in 1998, showed increasing figures of tourist arrivals in both 1998 and 1999[51] and this despite extensive coral mortality (Zahir, 2000). There are a number of possible explanations for decreased coral quality not affecting tourist behaviour. The fact that the good is lumpy or indivisible might be one explanation since it alleviates the individuals' ability to adjust behaviour to small changes in quality. Other reasons can be that tourists are not informed about the changed quality or that there is a lag in behavioural responses to these sorts of changes, or that changed quality simply does not matter to them. It might also be possible that the number of visitors remains constant but has different preferences, i.e. there is a shift in market segments; or since the event was global the *relative* quality of the reefs compared to substitute sites might not be worsened. The event could even have the perverse effect of attracting visitors who are curious to see the reefs before they "disappear". A few questions were added to the end of the questionnaire administered *after* the bleaching event to assess these possibilities, including questions about the knowledge of bleaching and how it affected the choice of holiday site.

The theoretical background to the model is developed in Andersson (2003), treating the visits as indivisible in consumption. The indivisibility characteristic, that the good is either consumed once or not at all, was epitomized in the empirical sample where 90% visited the respective islands for the first time, emphasising the single-visit character. Similarly, 90 % of the visitors originated from countries situated very far away with high costs both in time and money attached to a visit. The likelihood of frequent visits was small. The variance in the number of days the individuals stayed at the site was considered small enough to define all trips as the same good. On Zanzibar the majority of both multi-site and single-site visitors stayed between one and two weeks and the respective averages of the multi- and single-site visitors differed by

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[51] Source: Maldives Ministry of Tourism (1997, 2000). The number of visitors increased by 8% for both years.

only one day carrying the same median[52]. Given the fact that the trip to the region constituted such a large part of the overall trip, the variance in the number of days at the site was considered acceptable.

Yearly tourist visits to Zanzibar
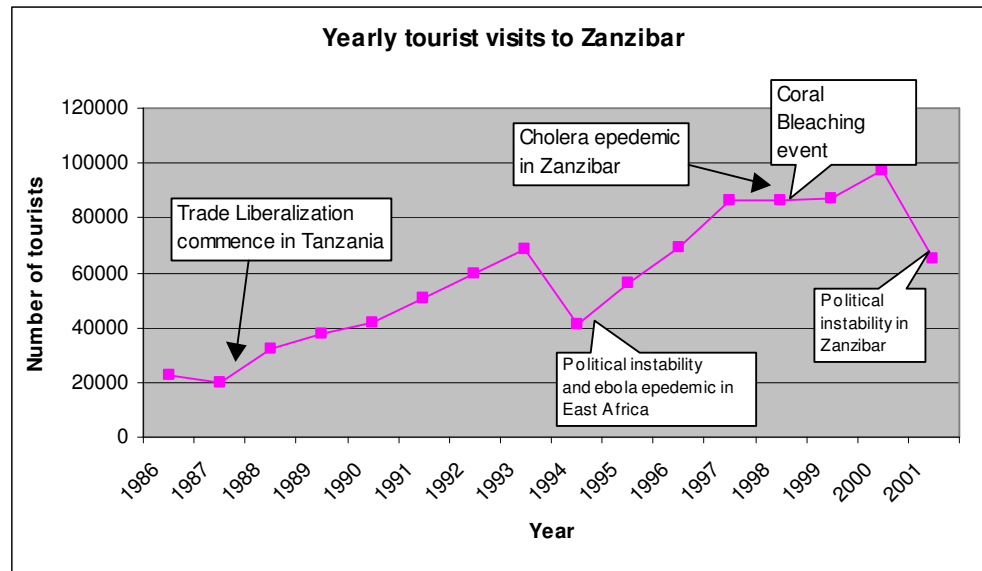
Graph 1. Yearly Tourist visits to Zanzibar between 1986-2001 (Source: Zanzibar Commission for Tourism)

While both islands were surrounded by pristine coral reefs they differed in their provision of alternative recreational attributes. Zanzibar has a long history as a commercial centre for Indian Ocean trade with an architecturally unique town centre accommodating shops and nightlife. Mafia is less accessible and provides few alternatives to its pristine marine and coastal environment. The diversity of corals and coral coverage was documented to be higher on Mafia compared to most places on Zanzibar. Coral reef scientists and the most commonly used tourist guides emphasized

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[52] The average for single-site visitors was 12 days and for multiple-site visitors it was 11 days. The median for both were 7 days.

the pristine marine environment and excellent diving comparatively more for Mafia than for Zanzibar.[53]

Coral bleaching and the preferences of reef quality

Coral reefs are highly complex and sensitive ecosystems where seawater temperature is one among many factors affecting their survival and development, but it is considered to be the primary limiting factor (Glynn and Werdt, 1991, Muhando, 2002). The optimum temperature for coral growth (26-28° C) is close to what has been documented as the upper lethal point, about 31-32° C (Jokiel and Coles, 1977). This means that small increases in temperature, especially prolonged exposure, will cause stress to the system. In situations of stress the coral releases its photosynthetic pigments, which results in "bleaching" of the corals. Unless the factor causing the stress is removed and the algae can return, the coral dies.

The yearly temperature peak in the seawater outside of Zanzibar is commonly recorded to occur in March –April and it was during this period *El niño* in 1998 hit the area and raised the temperature to a peak of 30.7 (Muhando, 2002). The sea water in the entire Indian Ocean was affected by this increase in sea temperature resulting in bleaching and mortality levels from less than1% in South Africa to 80% and greater on reefs in Northern Tanzania and Kenya (Obura, 2002) to as much as 95% on many shallow reef tops on the Maldives (Zahir, 2000). The damage varied considerably between reef areas even when the reefs were closely situated to each other. Shallow areas were in general more affected due to the combination of higher temperature at the surface and higher exposure to UV radiation. Accordingly, snorkelling activities and glass-bottomed boat trips were more affected in terms of recreational attractiveness, compared to diving activities.

As pointed out, little or no change in visitors' behaviour was observed after the bleaching. Given the lumpy and indivisible character of the good this does not necessarily mean that the individual's utility is not affected by the decreased quality. The stated preference question is designed such that it asks for the individual's

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[53] Based on readings in <u>Footprints East Africa Handbook</u> (1996), <u>The dive sites of Kenya and Tanzania</u> (1997), <u>Lonely Planets guide for East Africa</u> (1997, 2000), <u>Lonely Planets guide for Tanzania, Zanzibar and Pemba </u>(1999).

welfare measure comparing a visit to the site with or without coral reefs. The reason for selecting the value of access to reefs as opposed to some intermediate quality change is that it turned out to be very complex to assign a quality index to corals. Firstly, coral ecosystems are highly diverse and site-specific, even within a limited area. Secondly, coral is only one attribute contributing to the overall diving experience. Surveys of diving preferences show that fish is often the most important single attraction of a dive followed by visibility (Andersson, 1997, Cesar *et al*. 2002). Observing diving behaviour or asking stated preference questions of the quality of diving is thus likely to include preferences for other attributes besides corals. Fish, at least coral reef fish, indirectly depend on corals but examples are found where other structures such as granite structures in the Seychelles (Cesar *et al,* 2002) and shipwrecks (Wilhelmsson, 1998) are surrounded by a great variety of fish although nearby reefs are destroyed. If the value of corals is measured in isolation, embedding bias is then likely to be present. There are also great variations in the awareness of quality changes since to understand and take notice of changed quality of the underwater environment, knowledge and experience is required. Consequently, an expert might grade an area to be of poor quality while a beginner ranks the quality as high. Table 1 shows how the respondents at the two study sites graded different characteristics before and after the bleaching event, 5 being the highest and 1 the lowest grading[54]. The result does not show any significant change between before and after the bleaching and reef mortality. This is surprising. Equally surprising is that Zanzibar shows a higher aggregate grade, although not significantly so, compared to Mafia in the study before bleaching, which is not in line with biological surveys and guidebooks from this period. The explanation is the low grading for visibility recorded on Mafia. Visibility is seasonal and not an "environmental bad" but, as indicated above, of high significance for a good dive. This further illustrates the complexity of assigning values to a resource which only functions as one of several inputs to an activity. It could also be that the visitors to Zanzibar have less experience with coral reefs. The average sum of the grading reduced slightly on Zanzibar after

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[54] The question was posed in the following way*; "How would you grade the conditions of diving/snorkelling here on Zanzibar? Please grade each of the characteristics below on a scale between 1-5. Mark (5) for the best and (1) for the worse."*

the bleaching event but contrary to what one would expect, increased for Mafia. In all surveys "fish" scored the highest and it was significantly higher on Mafia. Is this the explanation to the lack of response in visitations to the quality decrease - that it was simply not observed?

CHARACTERISTICS	ZANZIBAR BEFORE BLEACHING	ZANZIBAR AFTER BLEACHING	MAFIA BEFORE BLEACHING	MAFIA AFTER BLEACHING
Wilderness feeling	3.20	2.90	3.52	3.40
Fish	3.73	3.56	4.12	4.62
Variety of Coral	3.60	3.44	3.97	3.92
Visibility	3.46	3.27	2.88	3.88
Overall condition of the coral	3.41	3.20	2.86	3.54
Adventurous	2.69	2.40	2.29	2.57
SUM	20.09	18.77	19.64	21.93

Table 1 Average grading of different characteristics at the respective site

As mentioned it is difficult to identify quality measures for coral reefs that in turn are useful for policy purposes. It is for example possible to show photos of *before* and *after* a quality change and ask respondents to state WTP/WTA for the hypothetical change. The question is how the result can be used for policy and applied to a real situation since all reefs look different and two very closely situated reefs will be differently affected by an external shock. This makes any hypothetical quality indicator difficult to apply even for very local governing. The opportunity to have stated and revealed preference data *before* and *after* a quality change is therefore of great value to gain insight into the preferences for coral reefs through actual changes in quality.

Theoretical Background

Let us assume that the individual decision-making process of where to go for vacation involves only one step, i.e. the individual does not first select a site and then decides what to do while at the site, but rather that the quality and the characteristics of the site is deterministic in the choice of the site. The individual selects a holiday resort based on exogenously determined prices for visiting the available sites, p^i_j and

a variable measuring the quality at these sites, q_j and the individual's income Y^i.
If $j = 0,1...n$ indicates all recreational alternatives, including the site of interest for the
study, let us call it site z the $j \neq z$ are substitute sites to site z. The utility of visiting
the target site z is then $V_z = V(Y^i - p_z^i, q_z)$ and the on-site sample restriction is defined
as:

$$V_z \geq \max_{j \neq z}\{V_0, V_1,...V_n\} \qquad \forall j = 0,1...n \tag{1}$$

Thus, all individuals included in the sample have selected site z because it provides
higher utility compared to any other recreational alternative for the given time period.

To estimate recreational welfare measures for the site, the price where the
individual is indifferent to going to site z or the next best alternative, needs to be
captured or estimated. This is the price where:

$$V(Y^i - \tilde{p}_z^i, q_z) = \max_{j \neq z}\{V_0, V_1...V_n\} \quad \forall j = 0,1...n \tag{2}$$

Equation (2) defines the choke price $\tilde{p}_z^i$ to visit site z, given that all other
variables are unchanged. Next, assume that all trips to site z are identical such that the
good being consumed is homogenous, i.e. can be defined as "a visit to site z". This
means that trips of different durations are treated as the same good. For this to be a
reasonable assumption the standard deviation of number of days at the site has to be
low. In addition the marginal cost of an extra day at the site must be low in
comparison to the cost of getting to the site, which should be true also for the person
buying the less-expensive trip. Consequently, multi-attraction trips are not included
and have to be dealt with differently than described below. To be able to derive
welfare estimates an additional restriction on visitor preferences is invoked, namely
weak complementarity i.e. the individual only attaches a value to the quality of the
good if consuming it. Lastly, individual preferences are restricted by defining the
good as indivisible in consumption, meaning that the individual only consumes it
once or not at all.

Given these assumptions the welfare measure for having access to the site w_a is defined as:[55]

$$w_a = \tilde{p}_z - p_z^{'} \quad (3)$$

as illustrated in Fig 1. This means that the choke price $\tilde{p}_z$ defined in (2)[56], together with the actual price the individual has paid to visit the site $p_z^{'}$, is the only information to be captured or estimated.

To estimate the value of a change in quality at the site the choke price of visiting the site given the new quality level also needs to be captured. Assume that the initial quality level $q_z = q_z^0$ deteriorates to a new level $q_z = q_z^1$. Since the choke price is a function of quality, a change in quality will result in a shift of the choke price. Given the assumptions above, the welfare measure for reefs $w_{quality}$ is then estimated from:

$$w_{quality} = \tilde{p}_z^{q0} - \tilde{p}_z^{q1} \quad (4)$$

This means that the respective choke price before and after the quality change must be captured or estimated.

In the empirical section the w_{access} and $w_{quality}$ in (3) and (4) are captured directly using stated preferences. It means that q_z^0 indicates the actual and existing quality of the reefs when the individual visits the site and q_z^1 a hypothetical quality level where the reefs at the site are completely degraded. The quality value accordingly measures the value of having access to reefs while visiting the site. The aim in this study, however, is to estimate the value of an intermediate change in the corals; the loss in recreational value caused by coral bleaching. Since the study deals with an actual change in quality and has available the same sort of stated information

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[55] For further clarifications of how this estimate is derived turn to Andersson (2003).
[56] Hereafter the individual subscript i is dropped.

before and after the change, the result of the stated responses (albeit to a different quality change), provides sufficient information for estimating the loss in value caused by bleaching[57]. Let us apply the superscript *no reefs* on the welfare estimate of a quality change due to completely degraded reefs, which is the quality change captured in the stated preference question. The questionnaire will then provide stated information of $w_{quality}^{no\,reefs}$ and w_{access} for both t=0 before coral bleaching and t=1 after coral bleaching. Thus, the two surveys contain stated information of:

$$w_{quality}^{no\,reefs\,t=0} = \tilde{p}_z^{t=0} - \tilde{p}_z^{no\,reefs} \text{ and } w_{quality}^{no\,reefs\,t=1} = \tilde{p}_z^{t=1} - \tilde{p}_z^{no\,reefs} \tag{5}$$

and similarly:

$$w_{access}^{t=0} = \tilde{p}_z^{t=0} - p_z' \text{ and } w_{access}^{t=1} = \tilde{p}_z^{t=1} - p_z' \tag{6}$$

The equations are illustrated in Figure 1. Apply the assumption of identical preferences of the individuals in the sample for both periods and assume that all other variables including the actual cost of visiting site z remain unchanged or are adjusted for between the same time periods. Then:

$$w_{quality}^{bleaching} = w_{quality}^{no\,reefs\,t=0} - w_{quality}^{no\,reefs\,t=1} = w_{access}^{t=0} - w_{access}^{t=1} = \tilde{p}_z^{t=0} - \tilde{p}_z^{t=1} \tag{7}$$

where $w_{quality}^{bleaching}$ is the loss in value due to bleaching. The result of equation (7) is illustrated in Figure 1. Accordingly, by simply subtracting the respective measure of the stated preference questions for the two time-periods, the loss in value from bleaching is estimated. The result, as equation (7) shows, should in theory result in the same measure for both questions. From the result in (7) it is also easy to see that revealed preference can be applied since $w_{quality}^{bleaching} = \tilde{p}_z^{t=0} - \tilde{p}_z^{t=1}$ and the chokeprices

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[57] It is uncertain how well a hypothetical stated-preference study would be able to directly capture the loss in value caused by bleaching simply because, as discussed above, bleaching as a quality level is difficult to define. This was the underlying reason for selecting "the value of access to reefs" in the original study.

for the respective time period can be estimated given only information of the actual prices of visiting the site.
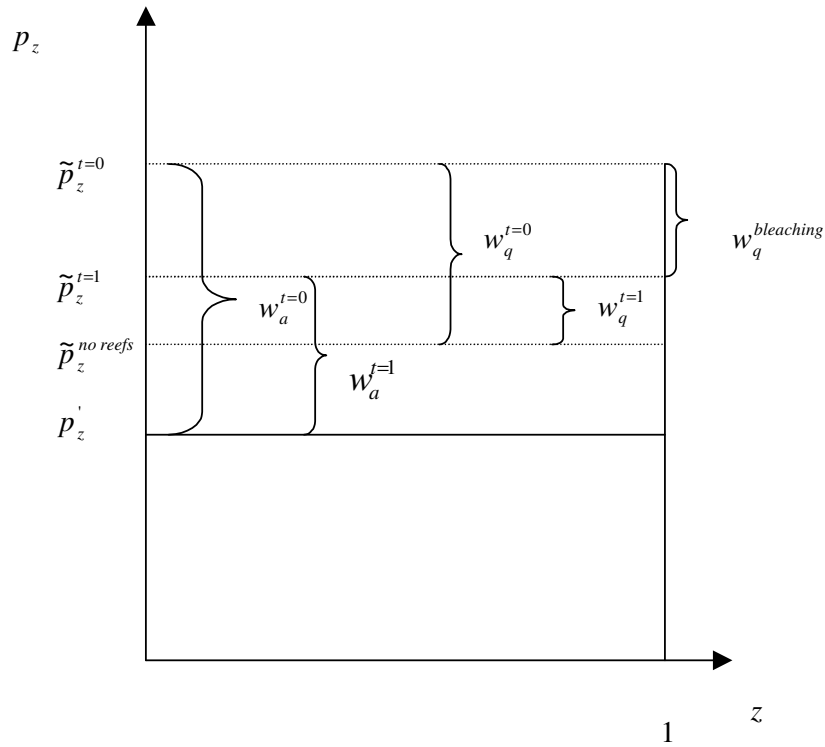
Figure 1. Demand for access to a site with indivisibility in consumption illustrating how the welfare estimates from the stated preference questions are derived.

Method

Study format

The design of the original questionnaire was initiated by a pilot test, undertaken in both Zanzibar and Mafia in March 1996. This was followed by a seminar, attended by both economists and ecologists resulting in modifications of the order, content and formulation of the questions. The first survey was carried out during peak tourist season in December-January and in low season January-February

1997. The follow-up study was administered in peak season in August 1999 and in low season September-October the same year. The fact that the respective studies were administered at different times of the year resulted in a smaller number of backpackers being included in the second sample compared to the first since backpackers mainly travel during the winter period in the northern hemisphere. The bleaching took place in spring 1998 and it was expected that by the time of administering the second survey, visitors would respond to the degraded reefs. The questionnaire was distributed in both English and Italian[58].

A selection of dive sites typically visited by different groups of representative travelers was made. On Zanzibar, the town area, a predominately backpacker area, and an area mainly occupied by luxury hotels were covered. A random selection of dive trips at the respective sites and dive operators was then drawn. In addition individuals at the beach and hotel areas were approached to also cover individuals who only snorkeled[59]. On Mafia, which is considerably smaller, all hotels providing dive operations were covered. At the time of both surveys, diving and snorkeling were the only reef-related recreational activities in the area. Glass-bottomed boats did not exist.

Altogether seven dive operators out of the ten then existing were covered on Zanzibar. At the time of the first survey only one dive business operated on Mafia where there were normally two. The questionnaires were handed over to the respondents to fill in on their own but there was always a person available for assistance. There might be a bias in the sense that the clients staying in the most luxurious hotels were under-represented due to reluctance among hotel operators of having interviews taking place in their hotel areas. In the second survey the interviewer was of local origin and had great difficulty in entering some of the self-contained luxury hotels.

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[58] The pilot study showed that the only nationality having difficulties with English were the Italians who in addition constituted a large proportion of the total number of tourists visiting the islands. On average 25% of the total number of international tourist arrivals were Italians (Commission for Tourism, Zanzibar).

[59] Although, snorkellers often used the dive boats to access the reefs, which means that they were automatically included at the dive operations as well.

Question format

The respondents were asked to state their actual cost of travelling to the site, the cost of accommodation and lastly how much they spent on food and contingencies during the visit. In the pilot study it was noted that while some individuals exclusively visited the study site others were on a multi-site trip. Hence, a section was added to capture the overall costs paid by the multi-site visitors. The individuals on a multi-site trip were requested to state their cost of travel, accommodation and contingencies for the entire trip as well as for the trip to Zanzibar/Mafia. Additional information about multi-site visitors was collected, including the sites they had visited or intended to visit and if they dived in other places while on the trip.

To capture the value for access the individuals were asked to state their WTP equal to w_{access} in equation (3) directly, by posing the following open-ended question: *"Considering your experience so far on this trip to Zanzibar, and the total cost of this trip; How much more expensive would your trip have to be before you decide not to come to the site?"*. This question was immediately followed by the following question *If the reefs on Zanzibar were completely degraded how much cheaper would your trip have to be for you to still come to Zanzibar?"* The latter asks the respondent to state the WTA compensation for a visit to the site in a situation of completely destroyed reefs, equal to $w_{quality}$ in equation (4). As discussed, it is complex to assign quality measures for coral ecosystems and therefore the measure of "with or without" corals at the site was selected. The first study was carried out without knowing that within a few years coral bleaching would hit the area.

In addition, other relevant socio-economic information, travel habits (during the actual trip and in the past), diving profile and perceptions about the reefs and the diving were collected for each respondent. In the second survey, questions about coral bleaching were added at the end of the survey. The respondents were asked about their knowledge of coral bleaching in general, if they had seen any bleaching while diving at the site and if the information that a site was affected by bleaching would affect their choice of holiday destination.

Discussion of the question format

The two stated preference questions are similar in that they are open-ended, use the cost of the trip as a payment vehicle and derive a compensated variation (CV) estimate, but they differ in that the w_{access} estimate is the result of a WTP question and the $w_{quality}$ of a WTA question. The reason for designing the questions interchangeably in a WTP /WTA format and not selecting either was that it was considered the most natural way of formulating the question to receive the most reliable responses. Another issue is that the stated questions are open-ended, a question format that has been debated in the literature[60]. The main argument in favour of open-ended questions here is that they provide more information than any discrete choice question[61]. The argument that open-ended questions provide a less familiar purchase scenario for the respondent was not the empirical experience of the study, maybe because the cost of the trip was used as a payment vehicle which meant that the choice situation, the good and the mode of payment were all familiar to the respondents.

Under common circumstances a WTP value is restricted by the individual's budget while the WTA is not bounded. The fact that the cost of travelling is used as a payment vehicle and that a quality decrease is measured, however, implies that there is an upper bound on the WTA response. The upper bound is the stated chokeprice for access. The reason for this is that it is the *use value* that is being estimated. The respondents state their WTP for the use of the site and the WTA for the loss of quality only in the case of using it and not for any possible non-use values attached to the site. Sometimes the individuals state a WTA value below the actual price indicated as the shaded area in Figure 2. In such a situation where $\tilde{p}_z^{no\,reefs} < p_z'$, the individual would exit the market and not come to the site and the welfare estimate is zero. This stems from the assumption of weak complementarity which means that $\tilde{p}_z - p_z'$ cannot be smaller than $\tilde{p}_z - \tilde{p}_z^{no\ reefs}$ and therefore $\tilde{p}_z - p_z'$ becomes the upper bound for

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[60] The NOAA panel (Arrow et al. 1993) as well as many CV practitioners share the view that closed-ended question formats are superior to an open-ended approach. The most common argument is that a discrete choice situation is more similar to a traditional market situation where it would be easier for a respondent to compare two utility levels as opposed to stating the single largest amount of money equalling these two utilities.
[61] Readers interested in the subject may see for example Ready et al.. (2001),Welsh and Poe (1998), Carson et. al. (1997), Brown et al (1996), Gregory et al. (1995)

the WTA response. In situations where $\tilde{p}_z^{no\,reefs} < p_z^{'}$ this is corrected for such that if $\tilde{p}_z - p_z^{'} < \tilde{p}_z - \tilde{p}_z^{no\,reefs}$ then $w_{access} = w_{quality}$. The result of the stated $w_{quality}$ is however included in the preceding estimations as a way to observe difference in the respective values and their respective consistency with theory. In the proceeding text, the stated response is denoted $w_{quality}^{no\,reefs}$ and the estimate that has been adjusted for by the weak complimentarity assumption is denoted $w_{quality}^{constrained\,.}$. The difference is the shaded area in Figure 2.
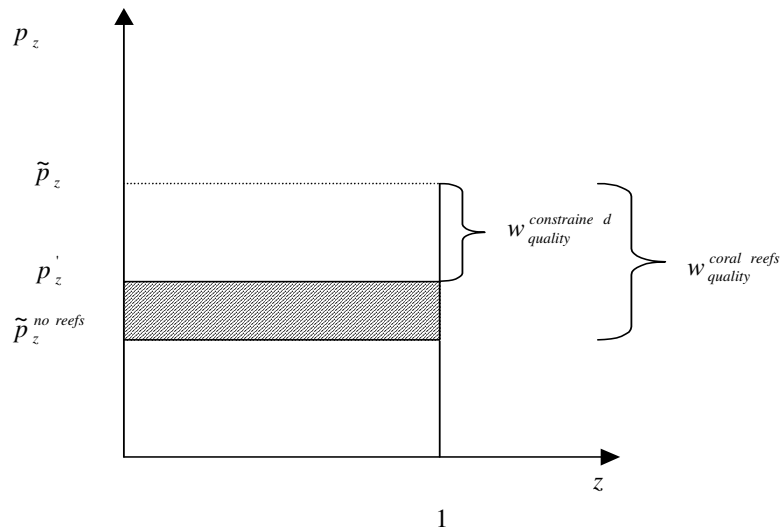
Figure 2. Indicating the difference between the $w_{quality}^{no\,reefs}$ and the $w_{quality}^{constrained\,.}$ estimates.

The risk for mis-specification bias is considered smaller for on-site surveys (Whitehead et al. 1995). Most individuals in the sample had previous experience of

coral reefs[62], which would supposedly improve the accuracy of the CVM responses. The familiar payment situation of using the cost of the trip as a payment vehicle is also expected to have a positive impact on the accuracy. To reduce the risk for strategic bias the respondents were informed that the university (usually thought of as a neutral institution), conducted the survey.

As mentioned above it is implicitly assumed that the reference level in the open-ended questions is at home since this seems to be the most plausible decision-making place. This is not explicitly stated in the question and in a repetition of the study the CVM questions could start with a sentence, …*imagine that you are at home and about to select which site to visit*… Given the assumption that the reference utility is at home the compensated variation equals the behaviour based welfare estimate derived from the choke price defined in equation (2)[63].

Result

Sample description

The response rate, in terms of people willing to fill in the questionnaire, was as high as 95%[64] for both time-periods. This is probably due to the fact that divers and snorkellers are in general interested in the marine environment,[65] and are accordingly willing to support attempts to improve its management. In total, 552 tourists were interviewed on Zanzibar and 71 on Mafia. Respondents who were residents, worked at the site, were below 18 years of age or provided inconsistent information were deleted from the sample. In instances where the interviewed individuals belonged to the same household they were treated as separate observations. This was considered appropriate since it was observed that the majority travelled on their own budgets[66]. The final sample consisted of 510 individuals for Zanzibar and 61 individuals for

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[62] The respondents in Zanzibar had on average conducted 71 dives previously and the respondents on Mafia 186 dives. The majority of these were undertaken in tropical waters with coral reefs.
[63] See Andersson (2003) for further explanations of this.
[64] This figure refers to the percentage of individuals who accepted filling in the questionnaire when being approached and asked to do so.
[65] This was confirmed in the questionnaire. On average, 85 % stated that they were "interested" or "very interested" in the marine environment for all samples.
[66] This might be because the average age was relatively low. Exceptions were some elderly couples where the woman had a comparatively low income or no income.

Mafia[67]. These figures represent about 1.4/0.75 % of the total international arrivals in Zanzibar for the respective time periods 1996-97/1999 and about 7.1/3.5 % of total number of tourists on Mafia during the surveyed time period [68]. For those the response rate *on the CVM questions* were 80/70% on Zanzibar and 81/85% on Mafia.

Descriptive statistics for the samples are shown in Table 2. Differences between the respective samples are found between the two sites rather than between the different time periods. Since a necessary assumption is that the individuals have identical preferences in the two time periods this facilitates the estimations. Changes observed between the two time periods are mainly related to diving and snorkelling behaviour. A measure of the intensity of "reef consumption" was constructed by assuming that two dives or two hours snorkelling represented a full day's "reef consumption". The number of days of "reef-consumption" was then divided by the number of days the individual stayed at the site. This value increased significantly on Mafia after bleaching while it instead decreased somewhat on Zanzibar. In terms of type of reef consumption both diving and snorkelling decreased on Zanzibar but on Mafia diving increased while snorkelling decreased. That snorkelling decreased is in line with the fact that bleaching hit shallow areas harder. Experience of diving, expressed in the number of earlier dives the individual had acquired, was considerably higher for Mafia compared to Zanzibar in the study before bleaching. After bleaching more experienced divers continued to come to Mafia but not to Zanzibar. Visitors to Mafia spent on average twice as much money on diving or snorkelling and the figure increased on Mafia while it remained the same on Zanzibar[69]. The fact that changes mainly had to do with people's behaviour related to reef consumption means that it might be an endogenous effect triggered by the bleaching. The characteristics of visitors differed between the two sites. The average age and annual income were

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[67] Among those 322 individuals were interviewed in Zanzibar in 1996/97 and 188 individuals in 1999. Thirty-seven individuals were sampled in 1996/97 on Mafia and 24 individuals in 1999.

[68] Numbers of Total arrivals to Zanzibar were acquired from Commission for Tourism and from hotel statistics for Mafia. According to these sources about 23 000 international visitors arrived on Zanzibar from 1 Dec 96- 1 March 97 and 25 000 from 1 August-31 October. Approximately 520 and 690 arrived on Mafia during the same periods. These are, however, total arrivals whereas the sample selection criterion was people who dived or snorkelled. There are no available statistics for the proportion of people diving or snorkelling among the total number of arrivals.

[69] The average daily cost spent on diving in Mafia was 33 USD (46) in 1996/97, which increased to 45 USD (21) in 1999. In Zanzibar the equivalent was 14 USD per day (15) in 1996/97, which increased slightly to 16 (17) in 1999. Numbers in brackets indicate standard deviation.

higher on Mafia and the visitors stayed on average twice as many days in Zanzibar compared to Mafia. That individuals stayed longer in Zanzibar is probably because Zanzibar offers more additional attractions compared to Mafia. Mafia was seemingly more profiled towards a specialised form of diving tourism.

Variable	Description	Mean Zan 1996/97	Zan 1999	Mafia 1996/97	Mafia 1999
INCOME	1=1_below 15″,2=15'-30',3=30'-45', 4=45'-60', 5=60'-75', 6=75'-90', 7=90'-105', 8=above 105'	2.8 (1.73)	3.0 (1.88)	4.0 (2.12)	4.5 (2.2)
FEMALE	1=female, 0=male	0.43 (0.5)	0.47 (0.5)	0.46 (0.51)	0.38 (0.49)
AGE	Age in years	30 (7.1)	29 (6.8)	39 (11.8)	40 (9.5)
EDU-CATION	1=Junior Sch., 2=High Sch.,3=BA, 4=M.SC, 4=PhD	3.01 (0.88)	3.13 (0.86)	2.89 (0.81)	3.0 (1.1)
IMPCORAL	Prop. "reef consumption" during trip to Z/M	0.35 (0.25)	0.32 (0.24)	0.59 (0.35)	0.86 (0.36)
MARINE INTEREST	1=Not interested, 2=Passive interest, 3=Interested, 4=Very interested	3.24 (0.72)	3.14 (0.69)	3.27 (0.73)	3.29 (0.69)
DAYS Z/M	Number of days spent in Zanzibar/Mafia	12 (7.4)	11 (11.6)	5 (3.01)	6 (3.5)
DIVE Z/M	Number of dives while on Zanzibar/Mafia	5.4 (5.6)	3.0 (3.32)	2.6 (3.7)	5.8 (3.87)
HRSSNOR	Hours snorkelled while on Zanzibar/Mafia	5.0 (6.6)	3.0 (5.38)	3.6 (3.8)	3.3 (2.8)
TOTDAYS	Total number of days when on a multi-attraction trip	72 (72)	44 (39.5)	20 (6.76)	34 (41)
PARTTRIP	1=Part of a larger trip 0=Only visit Z/M	0.49 (0.5)	0.75 (0.44)	0.49 (0.51)	0.67 (0.48)
PROP Z/M	Proportion of multi-site trip spent on Z/M	0.26 (0.18)	0.29 (0.17)	0.63 (0.39)	0.51 (0.37)
COSTDIV	Total cost spent on diving in USD	153 (199)	143 (148)	161 (263)	286 (245)
Z/M TC	Travel cost to Z/M in USD	513 (623)	337 (351)	551 (822)	564 (1092)
Z/M DAY COST	Total cost on trip to Z/M/number of days at site	103 (105)	92 (78)	256 (253)	238 (238)
EARLIER[70] DIVES	Total number of dives the individual had conducted before	49 (99)	31 (44)	85 (121)	92 (120)

Table 2. Descriptive statistics of the four samples showing the mean of the independent variables.

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[70] The averages were estimated only for divers *i.e* not for people whom snorkelled. Extreme outliers of individuals who had conducted above 1000 dives were deleted.

The origin of the visitors was scattered all over the world with a large majority originating from Europe followed by South Africans and expatriates from other African countries. A smaller portion came from North America and Australia[71]. A difference was observed between peak and low season where visitors from adjacent African countries dominated in high season while backpackers from Europe more frequently travelled in low season. This meant that for the combined sample as many as 98% were from a developed country. Interviews with dive operators confirmed that diving and snorkelling were activities exclusively carried out by tourists or temporary residents originating from foreign countries. In similar studies of game parks and other typical international tourist attractions, nationals often participate to a significant extent in recreational activities[72], but such was not the case for coral-related recreational activities. The distribution of nationalities changed for Zanzibar between the two time periods according to official statistics, but the samples did not represent this change. The number of Italian visitors increased by 40% between t=0 and t=1 resulting in Italians constituting about 27% of total arrivals to Zanzibar. The 1999 sample did not have a single observation of Italians[73]. To test if this had a large effect on the sample, a comparison was made by excluding the Italians in the 96/97 sample, but this did not result in any significant changes in the descriptive statistics.

In the 96/97 surveys, about 50% of the visitors at both sites were on a multi-site, tour in the EA region. In the 1999 survey this had increased to 74 % on Zanzibar and 66 % on Mafia. The most common additional attractions on multi-attraction trips were to visit game-parks in the northern circuit and to climb Mount Kilimanjaro. Among the multi-site visitors, 40% in the Zanzibar sample had also dived in other areas on the trip, the place most commonly stated was Lake Malawi which provided inexpensive diving certificates. The multi-site visitors from the Zanzibar 96/97 sample stayed in East Africa for an average of 2,5 months while the multi-site visitors in the Mafia sample stayed on average 20 days. In the 1999 sample the long-term backpackers were fewer and the average number of days the multi-site visitors stayed

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[71] See Table 3.
[72] See, for example, Navrud and Mungatana (1994) and Dave and Mendelson (1991).
[73] The main reason for this was the reluctance of hotels to allow local people to enter.

in the region decreased considerably for the Zanzibar sample while it increased slightly for Mafia. The proportion of the overall trip that the multi-site visitors stayed in Zanzibar/Mafia however, remained the same for Zanzibar while it decreased for Mafia.

Regarding the open question of substitute sites for Zanzibar/Mafia, the respondents stated typical diving areas, although they were not specifically requested to state dive sites, from all over the world. Table 3 summarises the results. The dive sites that were mentioned had been affected to varying degrees by the bleaching in 1998. For example, South Africa was not significantly affected while the Maldives was severely affected.

Among the Mafia visitors a large portion mentioned Zanzibar as a substitute site but not the opposite. In Zanzibar 91% from the sample visited Zanzibar for the first time and the equivalent for Mafia was 87%. The number that visited Zanzibar/Mafia for the first time decreased somewhat in the second survey. Among those who had visited the site earlier the majority were temporary residents of Tanzania, often residing in Dar es Salaam, which is the most closely-situated city for both islands.

"Zone"	Substitute site	Mafia (%)	Zanzibar (%)
Closely situated islands and coastal areas.	Mafia	----------	7
	Zanzibar	36	---------
	Pemba	12	4
Substitute alternative for multi-site visitors	Tanzania Mainland	0	2
	Kenya Coast	8	14
Island states and coastal areas in the West Indian Ocean.	Mauritius	0	2
	Seychelles	8	7
	Madagascar	4	4
	Mozambique	12	4
Substitute alternatives for single-site visitors	Comoros Islands	0	2
	South Africa	0	3
Other Continents	Red Sea	4	7
	Maldives	0	15
	Thailand	0	5
Substitute alternatives for single-site visitors	Great Barrier Reef	4	7
	Caribbean	4	11
	Micro- and Polynesia	8	6
SUM		100%	100%

Table 3 List of substitute sites stated by the respondents in an open question

Welfare Results

Stated Preferences

The average and median results of the responses to the open-ended questions of WTP for access (w_{access}) and WTA compensation for loss of access to reefs the ($w_{quality}$) are shown in Table 4[74]. A general observation from simply looking at the numbers is that they confirm what the sample description indicated and what was maintained by guidebooks and biologists alike, namely that the reefs on Mafia were of better quality and played a larger role for the overall utility of the trip compared to the reefs on Zanzibar. The value of access to Mafia as a site is similar to that of Zanzibar but the value of access to reefs while at the site is considerably higher for Mafia compared to Zanzibar. This is when observing the result of the average values. Surprisingly the WTA question on Zanzibar showed a high frequency of zeros, especially in the 1996/97 sample. This gives reason to suspect protest answers. What does a zero response represent in the respective question? For the w_{access} question the zeros imply that the individual's actual price is above or equal to the chokeprice i.e. $p_z^{'} \geq \tilde{p}_z$, it is, however unknown if it is above or equal. In the case of the $w_{quality}$ estimate, a zero response means that $\tilde{p}_z = \tilde{p}_z^{no\,reefs}$ and the individual places no value on the existence of reefs while visiting the site. This explains why there are no zero responses on Mafia given that the reefs are a major reason for going there. Since the $w_{quality}^{constrained}$ estimate carries the zeros from both the w_{access} and $w_{quality}$ estimates[75] the difference in the result of including zeros or not is more extreme for Zanzibar, carrying many more zero answers.

The two samples from the same site but from the different time periods were merged, i.e. Zanzibar 1996/97 and Zanzibar 1999 were combined into one sample and similarly for Mafia. A dummy for before and after bleaching was created and given

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[74] Prices and costs are deflated to 1997 (January) USD.

[75] This is because if $w_{access} = 0$ then $w_a = w_{quality}^{constrained} = 0$ and if $w_{quality}^{no\,reef} = 0$ then $w_{quality}^{no\,reef} = w_{quality}^{constrained} = 0$.

the high frequency of zero responses, a Probit for individuals with either zero or positive response and a Truncated Regression for respondents with w_{access} / $w_{quality}$ >0 was run[76]. This implies that the sample is treated as if it is from a truncated distribution with a truncation level at zero. Explanatory variables for the w_{access} estimate were income, gender, education, the proportion of the total trip spent on Zanzibar/Mafia (PropZ/M)[77], the dummy for bleaching and the average cost spent per day while at the site (Daycost Z/M). The latter variable was included to capture different tourist segments (low, medium, high budget). When testing for correlation between the variables, age and income were correlated[78] and to avoid correlation in the regression, age was dropped. Explanatory variables for the $w_{quality}$ estimate included the same socio-economic variables, the cost spent on diving or snorkelling while at the site (costdiv), the intensity of coral consumption during the holiday (impcoral), a variable indicating how the individual graded the quality of the dive at the site (quality), and bleaching. The variable of daily cost was removed. The results of the parameter estimates are displayed in Appendix A showing the marginal effects.

Since the issue of interest is to assess the change in visitor's welfare due to the bleaching effect, the bleaching dummy was closely assessed. The dummy indicates if there had been any change in the w_{access} and $w_{quality}$ response before and after the bleaching. This is summarized in Table 5. for the respective model and site. The Probit model shows positive values except for access to Zanzibar but only $w_{quality}$ on Zanzibar is significant. A positive sign means that visitors would be less likely to have zero w_{access} / $w_{quality}$ after the bleaching. For the truncated model the different samples show different signs. The w_{access} estimate for Zanzibar shows a negative sign and it is highly significant. The interpretation is that a person is willing to pay about 300 USD less for access to Zanzibar after the bleaching of the reefs. The willingness to accept compensation for the reefs on Zanzibar is positive but not significant and this is the same for the constrained estimate. For Mafia all relative values for

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[76] A selection model (Tobit type 2) was tested but the lambda was not significant.
[77] If the individual is not on a multi-site tour and only visits Zanzibar or Mafia, this variable equals 1.
[78] Zanzibar 96/97, 0.406, Zanzibar 99, 0.493, Mafia 96, 0.2341, Mafia 0.446.

bleaching are negative and significant especially for the reefs. The WTP for access to Mafia is reduced by 110 USD after the bleaching and the willingness to accept compensation by 555 USD or 255 USD for the constrained estimate.

	W_{access} (incl. zeros)	W_{access} (excl. zeros)	$W_{quality}$ (incl zeros)	$W_{quality}$ (excl. zeros)	$W_{quality}^{constrained}$ (incl zeros)	$W_{quality}^{constrained}$ (excl. zeros)
Zanzibar 1996/97, t=0						
Average value (USD)	470	570	420	555	246	376
% zeros(of total nr. of resp)	18 %	------	24%	------	35%	-----
(standard deviation)	(650)	(675)	(600)	(630)	(366)	(395)
MEDIAN	200	300	225	300	0	100
Number of respondents	257	211	250	190	250	162
Zanzibar 1999, t=1						
Average value (USD)	440	530	410	480	248	330
% zeros (of total nr. of resp)	17%	-----	14%	-----	25%	-----
(standard deviation)	(645)	(670)	(500)	(510)	(385)	(412)
MEDIAN	200	300	275	340	0	100
Number of respondents	135	112	128	110	128	96
Mafia 1996/97[79], t=0						
Average value (USD)	400	540	1090	1120	376	546
% zeros (of total nr. of resp)	27 %	------	3%	------	31%	-----
(standard deviation)	(920)	(1040)	(1010)	(1010)	(929)	(1084)
MEDIAN	160	250	300	300	0	300
Number of respondents	30	22	30	29	30	21
Mafia 1999, t=1						
Average value (USD)	370	480	1040	1040	261	348
% zeros (of total nr. of resp)	20%	------	0%	-----	25%	-----
(standard deviation)	(500)	(520)	(1650)	(1650)	(345)	(357)
MEDIAN	0	400	250	250	0	200
Number of respondents	21	17	20	20	20	15

w_{access} = WTP for access to the respective site

$w_{quality}$ WTA compensation for completely degraded reefs at the respective site

$w_{quality}^{constrained}$ $= w_{quality}$ has been adjusted for the weak complementarity assumption, i.e. when $\tilde{p}_z - p_z' < \tilde{p}_z - \tilde{p}_z^{no\ reefs}$

which means tat $w_{access} = w_{quality}$.

Table 4. The average values of the stated answers to the respective welfare estimates for all samples.

[79] In this sample an extreme outlier was reduced to not distort the result of the sample too much. The individual was a very wealthy individual who indicated a w_q of 12 400 USD.

A likelihood ratio test for pooling was applied to test whether it is reasonable to merge the two samples and treat them as having the same coefficients.[80] The result is shown in Table 5 together with the respective p-values. The following hypothesis was tested; H0: The same model applies to both samples, H1: The form of the model is the same for both groups but the parameters differ between the two samples. The result is mixed. The hypothesis that the two samples from the different time periods have the same coefficients is accepted for Zanzibar responses but not for Mafia where the null hypothesis is rejected. The Mafia result should be considered with caution and the decreased welfare measure due to bleaching might instead be explained by a shift in tourist segment, i.e. the assumption of identical preferences for the two periods does not hold. The fact that the Mafia result is less significant might be explained by the smaller sample size on Mafia.

Next the change in welfare between the two time periods is estimated by subtracting the respective estimates as in equation (7). The result is shown in Table 5. As discussed, it is uncertain how the fact that the w_{access} and $w_{quality}$ estimates are derived interchangeably from a WTP and a WTA question will empirically affect the $w_q^{bleaching}$ value. From the result it seems as if the WTA derived estimates i.e. the $w_{quality}$ estimate result in larger values which would suggest that the increment in quality has a relative effect on the WTP/WTA ratio. This is when using the estimate excluding the zeros.

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[80] Likelihood ratio test= -2*(L1-L2-L3) where L1=Likelihood Ratio for the merged sample, L2= Likelihood Ratio for the 1996/97 sample and L3= Likelihood Ratio for the 1998 sample.

	Probit (where w>0=1)			Truncated Regression (on w>0)		
	Coefficient bleaching dummy (p-value)	Likelihood Ratio Test for pooling (cr. v. at 0.95)	P-value 1-CHI(ratio,2)	Coefficient bleaching dummy (p-value)	Likelihood Ratio for pooling (cr. v at 0.95)	P-value 1-CHI(ratio,2)
Zanzibar w_{access}	-0.096 (0.104)	6.628 (11.07)	.24982	-308 (0.002)	-14.91 (11.07)	
Zanzibar $w_{quality}$	0.142 (0.0048)	12.4201 (12.59)	.02946	59.19 (0.4393)	9.498 (12.59)	.1474
Zanzibar $w_{quality}^{constrained}$	0.053 (0.4707)	9.39170 (12.59)	.15272	87 (0.1772)	11.11 (12.59)	.08509
Mafia w_{access}	0.039 (0.77)	-37.90 (11.07)		-111 (0.19)	17.96 (11.07)	.002993
Mafia $w_{quality}$	-------	--------	----------	-555 (0.011)	19.573 (12.59)	.05978
Mafia $w_{quality}^{constrained}$	0.078 (0.683)	13.29 (12.59)	.03863	-255 (0.005)	48.96 (12.59)	.7599 D-08

Table 5. The relative values of the dummy for bleaching in the merged samples (*p*-values in brackets). Before bleaching =0, after bleaching=1. A Likelihood Ratio Test is run testing the hypothesis that the two samples from the two different time periods have the same coefficient.

The average estimates for the value of access and loss of reefs are attached to very high standard deviations (which is normal since the questions are open-ended) and when applying a t-test none of the differences between the means of the two periods are statistically different. The result of the test function is shown in Table 6 where HO: $Mean_{96/97} - Mean_{99} = 0$ and H1: $Mean_{96/97} - Mean_{99} \neq 0$ are tested. The null hypothesis is accepted for all samples, which means that the decrease in welfare estimates after the bleaching event is not statistically significant and the loss of recreational value zero. It is accordingly not possible, based on the stated preference question and the assumptions attached to the model, to conclude that the bleaching has caused loss in welfare for the visitors.

	$w_{access}^{t=0} - w_{access}^{t=1}$		$w_{quality}^{noreefs,t=0} - w_{quality}^{noreefs,t=1}$		$w_{quality}^{constr,t=0} - w_{quality}^{constr,t=1}$	
	incl. zeros	excl. zeros	incl. zeros	excl. zeros	incl. zeros	excl. zeros
Zanzibar $w_q^{bleaching}$	30	40	10	75	0	50
Value of test function[1] (critical value 10%; 1.284)	0.435	0.508	0.291	1.063	0	0.967
Mafia $w_q^{bleaching}$	30	60	50	80	115	200
Value of test function (critical value 10%; 1.284)	0.1358	0.217	0.133	0.211	0.528	0.686

1.

$$t = \frac{Average\ value_{96/97} - Average\ value_{99}}{\sqrt{s_p^2\left(\frac{1}{n_{96/97}} + \frac{1}{n_{99}}\right)}}$$

$$s_p^2 = \frac{(n_{96/97} - 1)(stdv_{96/97})^2 + (n_{99} - 1)(stdv_{99})^2}{n_{96/97} + n_{99} - 2}$$

Table 6. The estimated recreational loss of value due coral bleaching, $w_q^{bleaching}$ using equation (7).

Revealed preferences

To apply the revealed preference method the choke price as defined in equation (2) needs to be captured for the two time periods. The first and rather problematic issue is, however, to derive the actual cost of the trip i.e. $p_z^{'}$. The difficulty lies in half of the individuals in the samples in t=0 being on a multi-site trip and even more in t=1. In the stated preference case this was not needed since the welfare estimate was derived directly. The questionnaire was designed in such a way that the individuals on a multi-site trip would themselves indicate the share of the cost of the total trip that accrued to the trip to Zanzibar. Unfortunately, this stated amount was often the factual cost of getting to the island e.g. taking the ferry from Dar es Salaam. This was not very useful in terms of reflecting the revealed preferences of visiting Zanzibar/Mafia as part of the multi-site trip, since logically a share of the

overall cost of getting to the area should be included. Among the multi-site visitors two distinct sub-groups were observed. One group stayed from two months up to a year, living on a low budget and travelling around East Africa. These sorts of travellers often included Zanzibar on their multi-site trips but rarely Mafia. The other sub-group consisted of visitors who travelled in the area two-four weeks, staying in the more expensive resorts. Consequently, the average number of days the multi-site visitors in the Zanzibar sample stayed in the region was two and a half months with a median of 30 days. Due to the great variation in multi-site visitors' *relative* stay in Zanzibar/Mafia on their whole trip to East Africa and the fact that there is no obvious way to divide these visitors' expenses between different sites, some assumptions were invoked. The low-budget multi-site visitors were treated as "residents". The travel cost for this group was the cost of visiting Zanzibar/Mafia that they had indicated in the questionnaire. The "population" of this group was then the total number of tourists entering the region. The luxury multi-site traveller's cost was approximated to the cost paid by the single-site visitors originating from the same country.

The cost of travelling from different countries was regressed against the probability that individuals originating from that country would visit the site. The cost of travelling from a specific country was estimated from the average and median cost paid by the individuals in the sample originating from that country. For some countries the individual variability in the price of the trip were small while others had substantial differences[81]. The sample for Mafia was too small to provide reliable estimates and was excluded from this exercise. For the measure of the probability of visiting Zanzibar, official statistics of yearly numbers of visitors from different countries in the world were used[82]. The "zoning" was adapted to this statistics. The number of yearly visitors was then divided by the population of that country or that region, measuring the probability of a visit from that zone *Pr(visit)*. Since the study showed that only visitors from developed countries participated in the recreation

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[81] This was for example the case for the UK, where the individual price ranged between 500 and 5000 USD.
[82] Zanzibar, which formed a union with Tanganyika in 1964, is an enclave of what is now Tanzania, having its own government. Custom authorities register all individuals entering the island, which provides the source of the statistics. In Mafia, which was part of Tanganyika, this sort of registration does not exist and anybody who has entered Tanzania will enter Mafia without being registered.

activity, an approximation of the number of expatriates in the African region was made. Table 7 summarises the results.

Region	Pop. (mill.)[1]	Nr. Visitors[2]		Nr. of visitors in the sample		Average cost[3] (USD)		Median cost (USD)		Pr(visit) (in 10 000)	
		1997	1999	1997	1999	1997	1999	1997	1999	1997	1999
Scandinavia	24	7 320	7 011	68	16	1550	820	1000	820	30,54	29,2
Germany	82	5 472	4 618	29	14	1030	920	950	900	6,67	5,6
UK	59	13 396	14 141	44	62	2200	730	1750	800	22,71	24,0
Italy[3]	57	16 542	23 279	19	0	710	650	600	650	29,12	41,0
Other EU[4]	153	12 277	13 310	21	40	920	910	900	1000	8,03	8,71
USA, CAN	301	6 642	6 745	18	19	2000	2000	2000	2000	2,21	2,24
Kenya[5]	3	4 924	2 790	1	3	250	345	250	300	175,86	99,6
Other Africa[6]	6	4 157	2 675	15	3	760	270	600	300	75,58	48,6
RSA[7]	13	2 664	902	48	4	640	650	600	600	20,75	7,02
AUS/NZ	22	5 206	6 324	1	19	780	700	780	700	23,45	28,5
Tanzania[8]	2	4 000	4000	14	0	146	150	68	100	200	200

1 Source Fakta kalender 2000.
2 Source Zanzibar Commission for Tourism.
3 In cases where very few or no observations are available approximations of the costs are made based on market prices of travelling from that country
4 Other European countries include The Netherlands (15,7m), Belgium (10,2m), Ireland (3,6m), Switzerland (7,3m), Spain (39,1m), Portugal (9,9m), Austria (8,1m) and France (59m).
5 Including an estimate for the 700 000 yearly visitors to Kenya (WDI, 1999)
6 Other African countries include: Uganda (22.2m) Namibia (1.6 m) Zambia (9.5m) Zimbabwe (11m) Swaziland (0.966m) Malawi (9.8m) Botswana (1.4m). It is assumed that 10 % of the total population in "Other Africa" are expatriates or have an income permitting them to undertake these sorts of trips.
7 For RSA it is assumed that 30% of the population is able to buy this sort of trip.
8 Including an estimate for the 350 000 yearly visitors to Tanzania (WDI, 1999)

Table 7 List of zones, their respective populations, and average and median costs of travelling to Zanzibar from each zone.

An OLS regression was run with the probability of visiting the site as the dependent variable and the cost of visiting p_z as the explanatory variable, i.e. $\mathrm{Pr}(visit) = \alpha + \beta p_z$, where the *Pr(visit)* equals the number of visitors from a certain region divided by the population of that region. The regression was run for both the average and the median values of the $p_z^{'}$ (see Table 6). The result shows correct signs and significant estimates for both the average value and the median value, (the output is displayed in Appendix B).

To estimate the aggregate consumer surplus (CS) value,[83] identical preferences for all individuals and identical incomes were assumed together with the assumption that all other variables had remained unchanged. By subtracting the estimates for the respective time periods the annual loss due to coral bleaching was estimated to USD 22-154 million, which would imply USD 254-1,780- per visitor (depending on whether the median or the mean is used).

Summary and Discussion

The result of the study provides two interesting questions worth pondering. Why do revealed and stated preferences result in such totally different values; are there theoretical and/or empirical explanations for this? And, second, given the result of the stated preference question, why are there no statistically significant differences in the welfare estimates between the two periods, since the respondents attach high estimates to access to reefs in general and a major deterioration in the quality of the reefs has *de facto* occurred?

Let us start with the last issue by assessing the result of the questions posed to the respondents in the second survey regarding knowledge and attitude on coral bleaching. The consumption of international recreational goods differs compared to many other recreational activities in that they are in general only visited once and that the visitors have no previous experience of the site. Information about site quality then has to be collected from other sources and efforts spent on information gathering will vary between individuals. Regarding the bleaching event in 1998, the media coverage was substantial, especially in diving journals (Westmacott et al 2000). The question is, did the visitors in the sample know about it? The results are displayed in Table 8.

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[83] The consumer surplus is estimated from; $CS = \alpha(\tilde{p} - p') + \frac{\beta}{2}(\tilde{p}^2 - p'^2)$, where $\tilde{p}_z = -\frac{\alpha}{\beta}$.

Variable	Mean (yes =1, no=0)	Std.Dev.	Cases
Zanzibar			
Heard of bleaching?	.286486486	.453346351	185
Influence choice of destination?	.725490196	.450707505	51
Would dive on bleached reef?	.400000000	.507092553	15
Seen bleached coral in Zanzibar?	.263157895	.446258350	38
Mafia			
Heard of bleaching	.625000000	.494535355	24
Influence choice of destination?	.866666667	.351865775	15
Would dive on bleached reef?	.333333333	.577350269	3
Seen bleached coral in Zanzibar?	.166666667	.380693494	24

Table 8. Result of responses to questions about information and behaviour related to coral bleaching.

Significantly more individuals had "heard of "coral bleaching in the Mafia sample. This is in line with earlier results that more "serious" divers visit Mafia. This question was followed by a request to state what they knew about bleaching. In the Mafia sample the majority related bleaching to rising temperature, global warming and *El niño* while in the Zanzibar sample the individuals commonly stated the *results* of bleaching; that the corals are white or that the corals are dead. This seems to indicate that more devoted divers are also more knowledgeable. It also highlights the large spectrum of different sorts of consumers, which exists for this activity ranging from "accidental" divers to divers who are highly dedicated to the sport and carefully select sites to visit. It also means that there is a market for low-quality reefs, maybe even dead reefs, but only to a certain segment of divers. The facts that new divers are being certified at an increasing rate every year means that this market can only grow. Another option is to profile the business to other types of coastal tourism, which is what the Maldives did after the bleaching; as already mentioned they have increased their visitation rate.

Next, the visitors were asked if coral bleaching would influence their choice of destination. Mafia visitors would to a larger extent avoid visiting a site affected by bleaching but the majority of the Zanzibar visitors would as well. This question was

followed by a "why", with the common response that it was not worth diving on damaged reefs, which contradicts the finding above that there is a market for damaged reefs. The respondents who stated that bleached reefs would not affect their decision to visit a site were asked if they would dive at such a site. About one-third would dive even if the reefs were bleached. Lastly they were asked if they had seen bleached reefs while diving during their stay on Zanzibar/Mafia. Surprisingly, a larger portion had seen bleached reefs on Zanzibar than on Mafia, despite the biological surveys showing the opposite. One reason for this might be that the number of tourists on Zanzibar is considerably larger and the dive operators do not have other options than to bring them to damaged reefs. Mafia can still provide excellent diving, for example, a few "walls" extend to deeper water and were less exposed to the rise in temperature causing the bleaching. This is, however, coupled to the preceding argument that there are fewer visitors on Mafia implying that these walls suffice to satisfy the expectations of the visitors while not being congested.

Regarding the difference between revealed and stated methods, the main theoretical explanation lies at the reference level. In the revealed preference situation the individual is not fully informed and the preferences are revealed solely based on *expectations* of the site and its reefs. It means that the reference level is subjective and imagined and varies between individuals. For the stated preference the individual's reference level is *at the site* meaning that all individuals in the sample have approximately the same reference level. Does the reference level matter empirically (or methodologically)? If an individual, for example, is ill-informed (or falsely informed) and expectations are not met will he "overreact" in a stated preference question?

One empirical explanation might be that other variables did not remain unchanged. It was for example observed that the factual cost of travelling from different countries had changed between the two periods, which impacts both the revealed and stated preference estimate. Another explanation is that the revealed preference data deals with populations of the world resulting in even marginal changes in the estimate of a variable, estimates that are sometimes approximations, causing large changes in the results. The advantage of the data however, was that

exact information of the number of visitors from the respective countries was available.

Conclusion and thoughts on further studies

The results of the study pointed in different directions; according to the stated preference questions there had been no loss in welfare caused by the coral bleaching, unless the bleaching dummy is interpreted. The revealed preference result shows high welfare losses but visitors keep coming to the sites and regarding the question of individuals seeing any bleaching while diving, the answer was mostly 'no'. So, what does this mean? Should the Government of Zanzibar not worry about natural phenomena affecting their underwater environment? Is there any danger in profiling the business in a specialised form such as towards diving tourism? The Mafia case showed that it is possible to have some sort of resilience in the ability to cope with shocks such as coral bleaching if the number of tourists is limited and that any change (within certain boundaries) in the supply of healthy reefs can be compensated for. In the case of Mafia, some of the most well known reefs praised in the most common guidebooks, were completely ruined[84]. The number of exclusive dive sites was, however, large enough to provide the product expected by even experienced divers. Less controllable is the effect of political instability. As was observed in Graph 1 the tourists seem to be more sensitive to political instability and epidemic outbreaks than to natural catastrophes such as bleaching.

An area that needs further study is the role of information. It is in the interest of the tourist industry to not spread information with potential negative effects on the industry while it is often in the interest of the research community to do so. The patchy nature of the damage from bleaching renders it difficult to provide an accurate description of the change in quality at any tourist destination. Intense negative reporting could destroy industries critical to the local economy by "marking" a site. There are recovery possibilities for the reefs; in Mafia the local community has participated in replanting the corals. If the scientific reporting had used Mafia as an example of a "worse case" scenario, and the information had reached divers, it could

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[84] Lonely Planet (1997), for example praises "Tutia reef" which was one of the most adversely affected areas in the whole region (Obura, 2002).

have led to a collapse of the market. Since Mafia was able to provide the product
requested by even the most serious divers and since visitors to the region are few, the
eco system and its recovery have not been distressed. Correct and balanced long-term
information is accordingly crucial especially for developing countries with small
economic margins. The media coverage of the event varied between countries
(Westmacott, 2000), which is something that could be assessed. The event was also
very well covered in diving magazines, which might be one explanation to why
experienced divers are more informed than occasional divers.

APPENDIX

A. The results of the parameter estimates, showing the marginal effects

Zanzibar w_{access}

Probit (WTP>0)=1

Variable	Coefficient	Standard Error	t-ratio	P-value]
Constant	.3977972952	.84036518E-01	4.734	.0000
INCOME	-.1031635458E-02	.11886338E-01	-.087	.9308
SEX	.2306504855E-01	.40659680E-01	.567	.5705
EDUCAT	.5125642974E-02	.23290128E-01	.220	.8258
PROPZNZ	-.2123168251	.62460309E-01	-3.399	.0007
ZDAYCOST	-.4090096687E-03	.20988949E-03	-1.949	.0513
BLEACHING	-.9604881514E-01	.59003221E-01	-1.628	.1036

Truncated on WTP>0

Variable	Coefficient	Standard Error	t-ratio	P-value
Constant	-36.94007746	150.34965	-.246	.8059
INCOME	51.72573771	20.290298	2.549	.0108
SEX	45.81754095	68.499492	.669	.5036
EDUCAT	-47.37006264	40.178851	-1.179	.2384
PROPZNZ	122.2318793	106.07266	1.152	.2492
ZDAYCOST	1.293400324	.43974834	2.941	.0033
BLEACHING	-307.7018931	99.704367	-3.086	.0020

Zanzibar $w_{quality}^{no\,reefs}$

Probit (WTA>0)=1

Variable	Coefficient	Standard Error	t-ratio	P-value
Constant	.2693337958	.13595718	1.981	.0476
INCOME	-.4466504839E-02	.13632745E-01	-.328	.7432
SEX	-.6480899380E-01	.51909597E-01	-1.248	.2118
EDUCAT	-.1607950145E-01	.28531689E-01	-.564	.5730
COSTDIV	.2008392885E-03	.16132501E-03	1.245	.2132
IMPCORAL	.1381557332	.99381340E-01	1.390	.1645
PROPZNZ	.1567252548E-01	.69780223E-01	.225	.8223
QUALITY	-.4983641554E-02	.58505149E-02	-.852	.3943
BLEACHING	.1423733644	.50432222E-01	2.823	.0048

Truncated on WTA>0

Variable	Coefficient	Standard Error	t-ratio	P-value
Constant	-609.0925146	232.45227	-2.620	.0088
INCOME	38.17849288	13.473748	2.834	.0046
SEX	1.009348100	48.663876	.021	.9835
EDUCAT	-55.32437934	29.289547	-1.889	.0589
COSTDIV	.1422332352	.81111561E-01	1.754	.0795
IMPCORAL	164.9416531	73.216620	2.253	.0243
PROPZNZ	410.5954259	127.90420	3.210	.0013

QUALITY	4.244350395	5.5843728	.760	.4472
BLEACHING	59.18662969	76.534256	.773	.4393

Zanzibar $w_{quality}^{weak\ compl.}$ *no reefs*

Probit (WTA>0)=1

Variable	Coefficient	Standard Error	t-ratio	P-value
Constant	.2510466015	.17329928	1.449	.1474
INCOME	-.2160593824E-01	.17358815E-01	-1.245	.2133
SEX	-.3498135900E-01	.63259055E-01	-.553	.5803
EDUCAT	.1805133126E-02	.36117726E-01	.050	.9601
COSTDIV	.2093190993E-03	.19894484E-03	1.052	.2927
IMPCORAL	.1503500002	.11691978	1.286	.1985
PROPZNZ	-.1282002460	.89011187E-01	-1.440	.1498
QUALITY	-.2615376335E-02	.74733087E-02	-.350	.7264
BLEACHING	.5354018913E-01	.74228541E-01	.721	.4707

Truncated on WTA>0

Variable	Coefficient	Standard Error	t-ratio	P-value
Constant	-292.3401844	154.13155	-1.897	.0579
INCOME	26.68443487	11.337973	2.354	.0186
SEX	12.00156299	43.841211	.274	.7843
EDUCAT	-33.06087438	24.647605	-1.341	.1798
COSTDIV	.9434807527E-01	.11036091	.855	.3926
IMPCORAL	.9022798262E-01	72.742870	.001	.9990
PROPZNZ	332.4018902	93.900266	3.540	.0004
QUALITY	-3.661632474	5.2148757	-.702	.4826
BLEACHING	87.18399952	64.610446	1.349	.1772

Mafia w_{access}

Probit (WTP>0)=1

Variable	Coefficient	Standard Error	t-ratio	P-value
Constant	-.8850838298	.35386824	-2.501	.0124
INCOME	.7157038647E-01	.37863126E-01	1.890	.0587
SEX	.3022424244	.12024818	2.513	.0120
EDUCAT	.1093962266	.70664900E-01	1.548	.1216
PORTMAFI	.2422403622	.17917423	1.352	.1764
MDAYCOST	.7704462362E-03	.48402869E-03	1.592	.1114
BLEACHING	.3937291107E-01	.13211779	.298	.7657

Truncated on WTP>0

Variable	Coefficient	Standard Error	t-ratio	P-value
Constant	-311.8522921	277.81368	-1.123	.2616
INCOME	18.57192929	19.363548	.959	.3375
SEX	-126.3668392	105.27006	-1.200	.2300
EDUCAT	48.58629390	49.738853	.977	.3287
PORTMAFI	-242.6694258	123.66796	-1.962	.0497
MDAYCOST	1.015844163	.13097902	7.756	.0000
BLEACHING	-110.6309669	84.044479	-1.316	.1881

Mafia $w_{quality}^{no\ reefs}$

Truncated on WTA>0

Variable	Coefficient	Standard Error	t-ratio	P-value
Constant	-664.0380312	629.54452	-1.055	.2915
INCOME	36.80112903	49.132995	.749	.4539
SEX	126.1527780	191.69245	.658	.5105
EDUCAT	170.5771697	99.020244	1.723	.0850
COSTDIV	1.609783913	.32816552	4.905	.0000
IMPCORAL	-108.4236567	270.77415	-.400	.6888
PORTMAFI	-89.93106187	263.46787	-.341	.7329
QUALITY	11.46085164	21.966755	.522	.6019
BLEACHING	-555.1484240	218.15886	-2.545	.0109

Mafia $w^{no\ reefs}_{weak\ compl.}_{quality}$

Probit (WTA>0)=1

Variable	Coefficient	Standard Error	t-ratio	P-value
Constant	-1.099488700	.65180527	-1.687	.0916
INCOME	.1215663138	.53882914E-01	2.256	.0241
SEX	.3996253370	.13232631	3.020	.0025
EDUCAT	.8637168895E-01	.91159031E-01	.947	.3434
COSTDIV	-.3007744151E-04	.30856436E-03	-.097	.9223
IMPCORAL	.1823722406	.22494201	.811	.4175
PORTMAFI	.3567183742	.24083896	1.481	.1386
QUALITY	-.5666077682E-03	.22496538E-01	-.025	.9799
BLEACHING	.7785175496E-01	.19063560	.408	.6830

Truncated on WTA>0

Variable	Coefficient	Standard Error	t-ratio	P-value
Constant	450.5913535	485.21002	.929	.3531
INCOME	8.687829762	25.269113	.344	.7310
SEX	-233.1731814	100.75979	-2.314	.0207
EDUCAT	-26.59188622	57.537272	-.462	.6440
COSTDIV	.7205224913	.14652343	4.917	.0000
IMPCORAL	-288.7750702	206.24834	-1.400	.1615
PORTMAFI	-482.8199199	128.39355	-3.760	.0002
QUALITY	9.203204488	11.123208	.827	.4080
BLEACHING	-255.5576070	91.436866	-2.795	.0052

B. Result of regressions run for the average and the median values of the p'_z.

Variable	Coefficient	Standard Error	t-ratio	P[|T|>t]	Mean of X
1996/97					
Constant	1217.155350	314.51097	3.870	.0038	
AVERAGE p_z	-.6771865463	.26638766	-2.542	.0316	998.72727

Fit:R-squared=.417940, Adjusted R-squared =.35327Model test: F[1,9] =6.46, Prob value =.03160

CHOKEPRICE[1]=1797

Aggr. CS[2]= `.10553888804773450D+09`

Constant	1252.197829	297.23536	4.213	.0023	
MEDIAN p_z	-.8238617248	.29031689	-2.838	.0195	863.45455

Fit:R-squared=.472237, Adjusted R-squared =.41360 Model test: F[1,9]=8.05, Prob value =.01947

CHOKEPRICE=1520

Aggr. CS= `.72602462853248000D+08`

1999					
Constant	1000.678289	272.12162	3.677	.0051	
AVERAGE p_z	-.7442306357	.31086052	-2.394	.0403	740.45455

Fit: R-squared= .389073, Adjusted R-squared = .32119 Model test: F[1, 9] =5.73, Prob value =.04029

CHOKEPRICE =1345

Aggr. CS= `.49451707604373660D+08`

Constant	1005.606233	259.62452	3.873	.0038	
MEDIAN p_z	-.7531977722	.29495862	-2.554	.0310	738.18182

Fit:R-squared= .419320, Adjusted R-squared =.35480, Model test: F[1,9] = 6.50, Prob value =.03123

CHOKEPRICE=1334

Aggr. CS= `.43113959753426490D+08`

1 the chokeprice is estimated from $\tilde{p}_z = -\dfrac{\alpha}{\beta}$

2 The consumer surplus is estimated from; $CS = \alpha(\tilde{p} - p') + \dfrac{\beta}{2}(\tilde{p}^2 - p'^2)$

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Trickle-down or Exploitation?
The role of Bargaining Power for Economic Development

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Abstract
Factors affecting the welfare of poor rural people in a situation of economic, social and institutional transition were analysed using the entry of the tourist industry into small traditionally governed villages in Zanzibar as a case study. The Nash bargaining solution was used as a focal point to model negotiations between a villager and an investor. The model was extended to explain distortions in bargaining situations including institutional failures, asymmetric information and asymmetric bargaining ability. It was found that the ability to credibly refuse a deal was the first necessary prerequisite for villagers to participate in negotiations for compensation. This was secured by enforced formal and informal rights but in addition had to provide meaning in traditional law and local reality. Due to the non-cooperative character of the game, lack of harmonisation between the local institutional framework and the investor's framework distorted the game due to asymmetry in information of the investor and the villager. Differences in outcomes when the village negotiated with local compared to foreign investors were used to assess the role of bargaining power for trickle-down to occur.

\- *Habana haba hujaza kibaba*[86] -
Swahili proverb

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[86] 'Little and little fill the *kibaba* measure' i.e. doing things a bit at a time will get you where you want to be.

Introduction

There is no question that increased international trade has improved welfare for many people. But is economic progress in a developing country, for example growth in GNP, always accompanied by a reduction in poverty i.e. does the so-called trickle down effect occur? This paper will assess the implications of trade liberalization for the poor segment in a developing country and identify factors conducive to welfare improvements for this group. From observations of the establishment of tourism in small coastal villages in Zanzibar, local people's ability to bargain for compensation and shares in revenue was identified to be a crucial component in securing and improving the welfare of the villages where the industry was established. The ability to bargain was modeled by extending the Nash bargaining solution to situations of institutional failure, asymmetric information and asymmetric bargaining ability. Such distortions were found to often characterize negotiations for compensation of property and lost production opportunities between the investor and the local villager. The underlying factors explaining why these distortions and asymmetries existed were also identified. This allowed for a directed discussion of policy relevant interventions as a means of reducing poverty.

The case study looked at the export of recreational services but similar examples can be found for other industries such as the foreign-owned trawling industry, large shrimp-farms in the mangroves, mining activities and oil-fields. The entry of these investments leads to a quick institutional transformation of a traditional, resource-dependent economy with geographically restricted economic exchanges. This implies an institutional shock to the community where investors, national and local government and local resource users suddenly compete for resources previously governed only by local villagers.

The villagers and national government often need outside assistance in giving life to the dormant capital that can create new economic opportunities. The question is how the capital generated is distributed between the different stakeholders. Revenues can trickle down to poor people through employment opportunities, changed relative prices or be collected and transferred through taxes or charges. The revenues can also

stay with the investor, leak out of the country or end up in the hands of local elites or government officials while the villager subsidizes the industry by giving up production opportunities and land without compensation. In all cases, the villagers' ability to bargain affects the outcome. This is why the factors providing bargaining ability are important determinants of well-being. Using examples from the case study, the large spectrum of factors providing bargaining ability, general as well as culturally specific, are identified and analyzed.

Using tourism as a case study is of particular interest since it is one of the fastest growing industries in the world where Third World tourism accounts for a growing share of this increase. Being recognized as a "clean" export industry by governments and foreign aid organizations, there is a need to improve and truly understand the welfare impacts it has for poor people.

The entry of the tourist industry

Zanzibar, a former spice exporting[87] island with a total population of about 600 000 inhabitants[88] experienced a virtual boom in tourist arrivals during the last decade. This development started with the economic liberalisation process in 1984 and then took off when the Investment Protection Act was amended in 1989, which explicitly aimed to increase private and foreign investments. Tourism was believed to have the greatest potential and entrepreneurs were invited to invest in a unique natural capital of unspoilt white beaches, coral reefs and friendly people, while being offered tax exemptions. Simultaneously, the tourist market on the Kenyan coast slowed down, mainly due to domestic instability, and investors already familiar with the area started to look for new resort areas[89]. Since Zanzibar had been a merchant state for centuries, the inhabitants were familiar with newcomers and strangers but had no previous experience of this type of development. A few hotels existed in the urban area but the

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[87] When the world market price of cloves dropped due to increased competition of new producers, the industry collapsed.

[88] When I refer to Zanzibar in the text it is Unguja I refer to. Zanzibar is formally comprised of the two islands Unguja and Pemba but since Unguja is rarely used as a name, especially in tourist situations, I simply call it Zanzibar here. In the latest census in 2002 the population of Unguja was estimated to be 622 450 and of Pemba to be 362 166.

[89] The Kenyan coast and Zanzibar are competing sites for the multi-site visitors coming to the area. These visitors often include a visit to the game parks in either Tanzania or Kenya and then spend some days on the coast (Andersson, 2004).

industry now quickly spread to the most remote places on the island. By the end of the 90's, most of the island's beach areas were served by resorts or smaller guesthouses. Tourist arrivals expanded from about 2000 visitors in 1988 to about 90 000 in the year 2000[90]. The tourism-zoning plan designated 444 ha on Unguja as potential Tourism Areas for the period 1993-2015. By 1995, 280 ha had already been formally allocated but considerably more had been exploited since numerous small guesthouses lacked land leases. Dahlin and Stridh (1996) recorded that in just three small villages they observed 27 establishments without land lease contracts.

Formal institutions were created to deal with investments, land allocation and tourist affairs[91]. While the procedure for small projects was not defined, the procedure for larger projects included several steps and a great deal of correspondence. An investor had to be formally approved and have a land lease before construction started. A survey from 1995 showed that slightly more than a quarter of the projects had sufficient documents (Dahlin and Stridh, 1996). The same authors estimated that it took about one year to acquire a land lease.

The island's economy has become dependent, directly as well as indirectly, on the tourism industry. Since 2001 the area has experienced a decline in tourist arrivals due to political turbulence on Zanzibar, the 2001 incident of the 11th of September, followed by terrorist attacks on typical tourist sites[92]. The expansion of the industry has affected the entire population of the island, but the coastal communities and their livelihood strategies have been particularly affected since this is the area most attractive for the industry. About 70% of the tourists stated that the primary reason for visiting Zanzibar was the beaches or the coral reefs (Andersson, 1997).

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[90] Source, Zanzibar Commission of Tourism.
[91] The Commission of Tourism (CoT) was established in 1992 as an autonomous body within the Ministry of Information, Culture, Tourism and Youth to promote Zanzibar as a tourist destination for smaller investment while the Zanzibar Investments Promotion Agency (ZIPA) was established the same year as an independent body within the Ministry of Finance to handle investment of larger financial nature. Commission for Lands and Environment (COLE) was responsible for allocating land for hotel projects, surveying and demarcating the plot, settling compensation issues and negotiating the condition for the lease.
[92] See Andersson (2004).

The institutional set up in coastal villages in Zanzibar

The coral rag area is not fertile and was originally of little economic interest. It, however, became the most attractive area for tourist development. Here an informal communal property right structure had remained comparatively stable in spite of several shifts in political and economic powers including the British Commonwealth legislation, the Islamic Law, and Socialist ideology (Shao, 1992). Many of the informal constraints that developed were similar all along Zanzibar's coast, the mainland of Kenya and Tanzania and islands within sailing distance[93]. The sea gave access to several parts of the East African coast and trade intermarriages, migration and seasonal work between the islands and the mainland were common phenomena[94]. Simultaneously each village formed its individual 'laws' of how to govern their resources given physical and environmental restrictions that existed in the specific village; no two villages looked alike.[95]

Each coastal community has access to several different ecological zones. Soil types and water are both distributed unevenly in relation to the relatively few sites with fertile soil and wells, which makes it more efficient to distribute individual ownership and access to many different areas; bush land, the sandy area, and the sea (Middleton, 1992). The efficiency of having widely dispersed rights in all zones of a village ranging from inland to the sea is confirmed in several studies showing that the dwellers typically had multiple income strategies often attached with an array of different access rules[96]. Similar types of dispersed rights have been identified for other areas in Africa possessing high ecological diversity (Ensminger, 1995)[97]. A typical Swahili village can be divided into at least five different zones (see Figure 1).

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[93] Middleton (1992), Caplan (1978,1997)

[94] This is referred to a number of times in different literature see for example; Middleton (1992), Caplan, (1975, 1997). The links are so strong that even after the revolution when entry to Zanzibar was restricted for inhabitants of mainland Tanzania and its islands, dhows continued to travel both officially and unofficially to Zanzibar from the mainland and adjacent islands (Caplan, 1997).

[95] See Tobisson, et. al. (1998), Andersson and Ngazi (1995), Middelton, (1992).

[96] See for example, Tobisson et. al. (1998), Andersson and Ngazy (1998).

[97] Embu is for example an area in Kenya ranging from the rich tea zone on the slopes of Mount Kenya, through the lucrative coffee area to the far more arid cotton zone in the low-lying area. This region was exposed to a land reform in late fifties where individual and private parcels were distributed. Haugerud (1983) found that by the end of the seventies more than half had more than one parcel, which is interpreted by Ensminger (1995) as a response to the fact that the system of dispersed rights still offered benefits that outweighed the cost of travel and dual maintenance.

Each of the zones is of vital importance for the combined production of cash income and subsistence goods for the members of the community; 1) agricultural land which will be referred to as *shamba* land (the e_S zone), 2) the living area, which is the sandy area where coconut trees grow (the e_L zone) 3) the beach area (the e_B zone), 4) the intertidal zone (the e_I zone), 5) fishing grounds (the e_F zone) and 6) mangrove forests (the e_M zone). It is worth noting that the details of the rights can vary considerably from one village or island to the next, depending on resource availability and constraints and differences in location. Common for all villages is that many of the property and access rights are informal and structured differently from the modern "market" economy; that is, they are individually and specifically adapted to the circumstances of every village. Ownership is respected and enforced through social norms and codes of conduct.
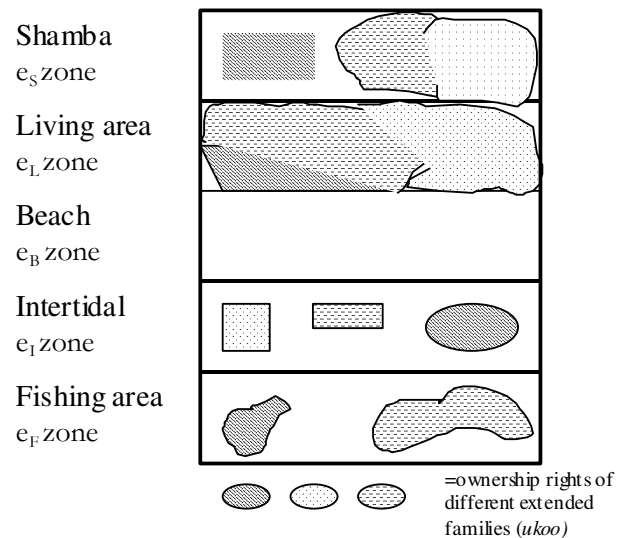

Figure 1. Example of a coastal village divided into ecological and economic zones showing dispersed ownership rights for the different zones of three different families. In many of these zones it is not land itself that is the main resource and hence there may be rights (to water, trees, paths, storage places) that overlap.

Zanzibar became independent in the end 1963 and already in 1964 the Union between the Republic of Tanganyika and the People's Republic of Zanzibar was enacted. The common Parliament may regulate only "Union matters" common to both the mainland and Zanzibar. Otherwise the Constitution of the United Republic preserves certain autonomy for Zanzibar by recognizing the right of Zanzibar to make its own laws. One area falling outside of "Union matters" is land tenure, which is regulated by Zanzibar's own House of Representatives. Since the formation of the Union, a number of land tenure reforms have been carried out, affecting the path of the island's institutional transition.

Due to historical events, the coastal villagers had created institutions to protect their rights to land and resources against powerful intruders[98]. Caplan (1975) mentions institutional restrictions for getting permission to use someone's land in the e_L zone (something that did not exist for the e_S zone, which was situated further from the village center) because people were afraid that outsiders would establish permanent rights in the village. Middleton (1992) notes institutional restrictions with similar intentions targeted specifically for protection from the more powerful townspeople, who historically were perceived as competitors for valuable resources. He goes so far as to characterize it as part of the village people's identity; "*The country towns* [villages] *often regard themselves as exploited and seen as socially backward by the more powerful stone towns* [the urban areas]*, and translated this largely into ethnic and religious terms."* As examples he describes a low acceptance of intermarriages with townspeople, that villagers insisted that members of their extended families (*ukoo*) should have the "proper" skin color and that the ruling Arabs were refused as tenants in the villages. This sort of protection from outside control particularly existed for the e_L zone. Caplan (1992) observed a similar, more recent, desire to secure communal bargaining power vis à vis the townspeople. The villagers raised a considerable amount of money for investing in a lorry; not as the author initially thought for transporting goods but for allowing the villagers to

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[98] According to Sheriff (1991), the people who settled in the rag areas may have been forced to do so after being expropriated from their agricultural land in the lowlands and losing their hunting and wood collecting rights in the forest areas of the great landowners. Middleton (1992) refers to the exploitation of village land by the stone townspeople using terms such as "internal sub-colonialism".

participate in the political life in town, thereby decreasing the inequality between themselves and government officials.

Before the entry of the tourist industry the institutional set up in the village was accordingly characterised by customary governance of land and resources. The members of the community had through repeated negotiations reached a stable way of sharing resources and obligations where social norms and codes of conduct can be seen as self-enforced strategies all members subscribed to. This can then be regarded as an equilibrium. The intuition behind this is that when members expect to encounter one another repeatedly in similar situations, a short-term gain from deviation from community collaboration is outweighed by even a small loss in utility in every future period[99]. The stability is accordingly vulnerable to external shocks that change the relative payoff or the access to new individual opportunities. This does not mean that any one shock will make collaboration collapse. Natural, repeatedly occurring catastrophes could, for example, become part of the collaborative framework and institutions be built to cope with such shocks. The norm system can adjust to the new situation and the stability and collaboration can be preserved. But collaboration is built on members expecting to interact often and for a long period of time. Access to extended markets, for example, reduces the expected dependency of future interactions in the village and the expected benefit from complying to the village norm. The result is that the norm ceases to be self-enforced. The entry of the tourist industry is an example of a major change in the payoff structure. New economic opportunities drastically increased the prospect of higher immediate incomes that outweighed the future cost of deviating from the old system. When the collaborative framework collapses, heterogeneity in income increases and some groups can become more vulnerable.

The entry of the new industry meant that the investors started to compete for access to village land and adjacent resources. The villagers' ability to be compensated for loss of land and resources depended on their ability to negotiate. The theoretical

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[99] The game theoretical term for this is the folktheorem. A more detailed description of the folktheorem can be found in most game theoretic textbooks, see for example Fudenberg and Tirole (1996). See also Dasgupta (2001, pp 202-204).

model used to assess the implications of different bargaining situations is the Nash bargaining solution.

Nash Bargaining Solution

When investors lay claim to land and resources in a village, the negotiations with the villagers can be characterized by a non-cooperative game. In this kind of situation there is in general no unique equilibrium for the game - there are often many. A way out of this problem is to follow Schelling's (1960) equilibrium selection and look for a focal point. Schelling argued that in a game with multiple equilibriums, anything that tends to focus the players' attention to a specific equilibrium makes them both expect this equilibrium and hence fulfill it.   A focal equilibrium is an equilibrium that has some properties that noticeably distinguish it from other equilibriums. One such natural focal point is the Nash bargaining solution. If both players accept the basic axioms of the Nash bargaining solution, i.e. invariance with respect to increasing linear utility transformations, Pareto optimality, independence of irrelevant alternatives and finally symmetry, then there is a unique outcome that satisfies all these principals. The argument for the players' acceptance of the axioms is that the axioms provide a consistent solution that can be formulated and defended. This means that it is likely that both players find them reasonable and find it reasonable that the other player will think likewise, accordingly providing the prerequisites for a focal point.

A short "textbook presentation" of the Nash bargaining solution is illustrated in Figure 2 showing two players who intend to trade in a single period[100]. The bargaining problem is characterized by two factors; the region R of the plane which defines the possible outcomes in utility terms of the game and the player's initial point $(v_1^{'}, v_2^{'})$. No player will agree to an outcome less than the utility in the initial point. Thus, the feasible outcome set is delimited by the area e,b,c,f in Figure 2. The Nash bargaining solution is defined as the point $(u_1^{*}, u_2^{*}) = c$ where;

$(u_1^{*} - v_1^{'})(u_2^{*} - v_2^{'}) \geq (u_1 - v_1)(u_2 - v_2)$ for all (u_1, u_2) belonging to R, and such that

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[100] For a wider discussion of the Nash Bargaining Solution see for example; Luce and Raiffa (1964), Myerson (1991) and Fudenberg and Tirole (1996).

$u_1 \geq v_1$ and $u_2 \geq v_2$. Letting F be the function describing the set of efficient points the procedure becomes as follows;

$$\max (u_1 - v_1)(u_2 - v_2)$$
$$s.t.\ F(u_1, u_2) = 0 \tag{1}$$

and we will assume that this maximum point can be interpreted as a focal point for the non-cooperative game.
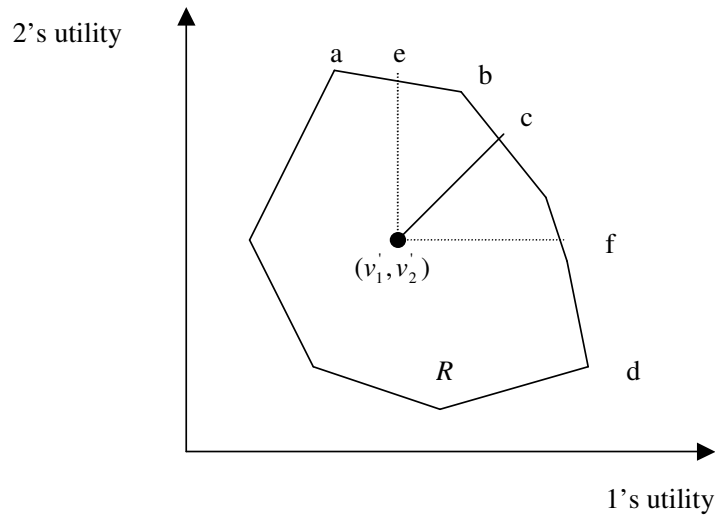
Figure 2. Two agent bargaining situation illustrated with Nash's bargaining solution[101].

The game was extended to include factors, observed in the case study, which distorted the outcome of negotiations. These were, institutional failures, asymmetry in bargaining ability and asymmetry in information. Each of these extensions will be

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[101] The region in this example is polygonal, which means that the underlying set of trades is finite i.e. what is traded is not infinitely divisible.

presented separately but first the basic model will be applied to a negotiation situation for land between an investor and a villager.

Application of the basic model[102]

Suppose an investor intends to buy land from a local villager. Indicate the villager's return from the land $r = r(e_L)$ and consider this his initial (reservation) point $r = v_1'$. The return from the same piece of land for the developer is the profit from the investment $\pi = \pi(e_L)$ less the compensation he has to pay to the villager for giving up land C. Assume that:

$$\pi(e_L) > r\ (e_L) - r(0) \tag{2}$$

where $r(0)$ is the villager's return from the land when it has been transferred to the investor[103]. Equation (2) implies that the investor can compensate the villager and still be better off than before the deal. For the bargaining situation assume that $\pi - C$ is the investor's return from a deal and that return is zero if there is no deal[104]. Further assume that the villager's return from a deal is $C + r(0)$ and $r(e_L)$ is the return from no deal. The villager will not agree to a deal that is below $r(e_L)$ and the investor will not agree to a deal less than the next best investment alternative (which for simplicity of presentation is assumed not to exist here). Given (2) it is possible for the villager to bargain for compensation. Assuming that the investor is risk neutral and accordingly has a linear utility function, the Nash product can be formulated as:

$$NP = [(\pi - C)][u(C + r(0)) - u(r(e_L))] \tag{3}$$

Rewrite the last term to $C \cdot u'(r(0)) - \Delta u$ using linear approximation where $\Delta u = u(r(e_L)) - u(r(0))$. The value of C that maximises the Nash product is then:

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[102] Note that monetary terms for revenues and utility terms are used interchangeably.
[103] He may reserve certain rights or benefits even after a sale.
[104] If the investor could invest at another site this would not equal zero but would equal the opportunity cost of investing at this site.

$$C = 1/2(\pi + \Delta u / u')$$ (4)

The Nash bargaining solution accordingly says that the investor and the villager should share the profit from the industry and the value of land. If this is the focal point then it will be the non-cooperative solution. Note that the outcome depends on the villager's marginal utility of income. If the villager and the investor had equal marginal utility of income they would equally share the total gain from the profit made by the investor and the value for land. In reality it is likely that the villager is poor and has higher marginal utility of income than the investor resulting in a lower payoff. Differences in marginal utility of income are thus integrated into the "solution", but other asymmetries and distortions are not.

Institutional failure

Many examples in the case study indicated that due to institutional failures the initial point is not a legitimate threat point, which means that we have to modify the game. If the villager lacks enforced rights to land he cannot credibly threaten to quit negotiations below his initial point. Since this is the point where the villager is indifferent to participating in the game or not, a deal settled below this point implies that:

$$\left[u\bigl(r(0) + C\bigr) - u\bigl(r(e_L)\bigr) \right] \leq 0$$ (5)

The lack of ability to credibly threaten to not participate results in that no factual bargaining situation exists. The initial point consequently shifts in a northwestern direction. How much it shifts depends on the degree of dependency between the investor and the villager. If the villager has zero ability to threaten the investor in any way, the investor selects his best payoff, which is point *a* in Figure 2. In money terms this equals the investors full profit from making the deal paying zero compensation to the villager. This is illustrated in Figure 3 as point $(v_1^{''}, v_2^{''})$.

This is an extreme situation and in reality the villager might still have certain means to threaten the investor. Assume, for example, that the investor needs staff and wants the villager to remain in the village. The villager is not able to refuse a deal for land but can threaten to move somewhere else. This is illustrated as (v_1''', v_2''') in Figure 3 where the villager is better off than in (v_1'', v_2'') but still worse off than in the original status quo point (v_1', v_2'). The important result is that to have the ability to bargain, the villager must have a credible option of refusing a deal.

After a new status quo point has been established, negotiations can occur and the Nash bargaining solution be applied as a focal point. This means that it is still possible for the villager to reach a solution where he is better off after the entry of the industry despite having lost land without compensation. This implies that the solution in the new bargaining situation is larger than the initial point before the industry was established $u_1^* > v_1'$ (as illustrated in Figure 3). This is possible due to Equation (2) indicating that the investor can generate larger revenues than the villager from the same land. If the industry has trickle-down effects, the villager can thus capture parts of the revenues generated by the industry, for example from new employment opportunities.
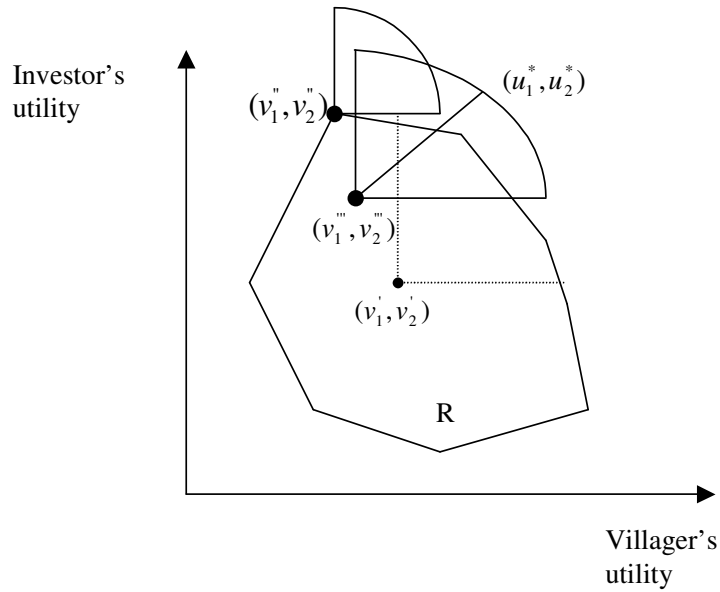
Investor's
utility

(v_1'', v_2'')

(u_1^*, u_2^*)

(v_1''', v_2''')

(v_1', v_2')

R

Villager's
utility

Figure 3. The villager lacks the ability to refuse a deal below the initial point $v_1' = u(r(e_L))$, which means that the status quo point is shifted to the investor's best payoff, the full profit from the deal $v_2'' = \pi(e_L)$.

Asymmetric information

There are several examples of asymmetric information in the case study. In general the villagers have no earlier experience of the technically, economically and institutionally advanced industry entering their village, which places them in an inferior position. Another example is the fact that two different institutional norm systems meet in a non-cooperative game. This implies that the villager might expect an outcome of a deal that due to lack of information will not become the actual outcome. The player who is better informed about the expected outcome then has a relative advantage.

Asymmetric bargaining ability

Consider a situation where the villager's right to land is protected and negotiations for compensation are initiated, alternatively, that right to land is not protected but the villager is employed by the new industry and is about to negotiate for a salary. The fact that these rights are protected does not mean that the bargaining

situation is symmetric. The villager is often in an inferior position due to language restrictions, lack of knowledge and previous experience. Assume that the ability to bargain can be defined and measured and denote the players' respective bargaining abilities as α and β such that $\alpha > 0$, $\beta > 0$. The solution to any essential two-person bargaining game can then be described as the point that maximises the following generalised Nash product:

$$(u_1 - v_1)^\alpha (u_2 - v_2)^\beta$$

(6)

The frontier of points e to f illustrated in Figure 2 defines the max utility player 2 can receive given player 1's utility where F is the transformation curve. From the maximisation problem defined in Equation (1) then[105]:

$$\frac{\alpha}{\beta} = \frac{F_1'(u_1 - v_1)}{F_2'(u_2 - v_2)}$$

(7)

The size of the payoff $(u_1 - v_1)$ is accordingly a function of α. As already pointed out, a villager typically had higher marginal utility of income (indicated F_1' in Equation 7) compared to the investor. Consequently, if the villager has both a high marginal utility of income and poor bargaining ability (small α) the payoff is low.

Note that when using the Nash bargaining solution as a focal point the players are aware of the asymmetry in bargaining ability. This implies that they are both satisfied with the deal even though it renders the player with a lower ability a relatively lower payoff.

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[105] Maximise the following Lagrangian; $L = (u_1 - v_1)^\alpha (u_2 - v_2)^\beta - \lambda(F(u_1, u_2))$.

Let us now turn to the case study to identify underlying factors of institutional failures, asymmetry in information and asymmetric bargaining ability.

Institutional failures

Compensation for land

The most attractive area for hotel constructions, the e_L zone close to the beach was of great importance to the villagers in Zanzibar. This was the area where they lived, worked and socialized and as mentioned earlier, institutional restrictions had historically been designed to protect this area from outsiders.

We are looking for factors that provide or restrict the villagers' ability to refuse a deal. A study showed that villagers on Zanzibar were more satisfied with compensations issued for the e_L zone compared to those issued for the mainland. On the mainland the villagers were either not compensated at all when land was allocated for hotel construction or compensation was perceived as being too low (Kulindwa *et. al.* 2001). When assessing the differences in procedure, the mainlanders were in general less able to refuse a deal. The underlying reason was that the central government allocated plots for hotel developments without involving either the local communities (who live on the land) or the local government. Permits for developments were provided to the prospector centrally in Dar es Salaam[106] and the local or district government was simply instructed to facilitate the surveying of the plots in the villages (Kulindwa *et. al.* 2001). The investor could offer compensation to the villagers but this was decided arbitrarily by the investor; given the complaints of the villagers it was probably below the initial point i.e. in line with Equation (5). This means that the initial point shifted to the left as illustrated in Figure 3. The situation was different in Zanzibar where the procedure for an investor to apply for a land lease commenced with a visit to the site by government representatives[107]. The visit to the village included interactions with the villagers and local governmental representatives. Governmental representatives and the investor signed the land lease after compensation had been paid or the plot had been surveyed.

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[106] Dar es Salaam is the economic capital in Tanzania.
[107] This includes representatives from ZIPA, COLE, and CoT.

Why was ownership to land protected by the government in Zanzibar? When the tourist industry started its activities, land in the villages was sold in accordance with customary law i.e. by ownership of trees. Trees had historically been a distinctive part of Zanzibar land law and since colonial time they could be subject to mortgage (Jones, 1996)[108]. In the Land Tenure Act (1992), trees were treated separately from the right to the occupancy of the land and the requirement of clear registration had priority. This meant that if tree ownership was not formally separate from the occupancy right in the land or lease, that it was then irrefutably presumed that the trees were included in the land (Jones, 1996). Most villagers did not possess any registration of their ownership of trees. New formal legislation was, however, not yet enforced[109] and informal rules were respected most likely because of the long tradition that had made them an integral part of both formal and informal law. This meant that despite informal ownership, the villagers were in a bargaining position for compensation for land since a land lease was not signed before compensation to the villager had been issued. The formal institutions installed on Zanzibar to deal with these issues and the short distance between policymakers, local government and villagers assisted in securing this right. Important also at the time when the tourist industry entered, was that ownership of trees was private and impersonal, which facilitated the identification of the bargaining partner[110].

Compensation for loss of production possibilities
The example of the e_L zone illustrated that even though ownership was informal it was secured and enforced. For other zones important to the villagers' production strategies such as the beach, the intertidal zone, the fishing area and the mangrove, the right to *access* received formal protection in that all land was vested in the government. This was also explicitly stated in the newly developed plans for the launching of the tourist industry. In the National Land Use Plan it was stipulated that;

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[108] While in the coastal area this mainly concerns coconut trees, the law included all trees of commercial importance such as mango and clove trees.
[109] In fact the whole set of formal regulations is neither publicly distributed nor adopted into COLE's daily activities.
[110] This had not always been the case; earlier the trees in a given area were owned by the *ukoo*, the extended family.

"*Residents involved in fishing and related activities, seaweed farming etc. require unrestricted access to the coastal zone and beaches*". And in The Tourism Zoning Plan it was stated that "*Villagers' access to the beach must be unimplingibly respected*" as well as "*Sites should be allocated so that fishermen's access to landing sites is preserved and fishermen are not forced to move because of conflicts between their activities and activities of the hotel*" (Dahlin and Stridh, 1996). Despite these explicit guidelines investors tended to extend their rights beyond shared access and demand changes in the villagers' behaviour and relocation of production activities. For certain types of relocation the villagers received compensation - for others they did not. Let us analyse the reasons behind the differences.

The e_I zone is rich in production possibilities due to tidal changes, especially for women who traditionally did not enter boats. At low tide, women used to pick seacucumber, octopus and seashells on the flat (Andersson and Ngazy, 1995, 1998). Recently, and as a response to decreasing stocks, another activity of high economic importance has developed (also exclusively carried out by women), namely seaweed farming. Small plots were built on the flat using wooden sticks to attach the seaweed to. The small farms scattered in the water disturbed the picture of the clean and untouched environment sold to the luxury tourists and the foreign investors wanted them removed. Farm owners were compensated for removing the seaweed cultivations[111]. Another activity, again mainly performed by women, was to bury coconut husks in the sand to produce rope. To mark the place of the buried husk, a stick was inserted in the sand. This was dangerous for tourists walking in the water at high tide and the women were asked to remove the activity. I have not heard or read of any compensation being paid for removing this type of activity[112].

Fishing activities also took place in the intertidal zone. One fishing technique with a long-standing tradition was to build fence traps (*uzio*) that at low tide caught the fish that was then simply collected[113]. The *uzio* was an open half-moon shaped structure made up of sticks thrust into the sand. The structure extended up to one

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[111] Dahlin and Stridh (1996), Benjaminsen and Wallevik (1998), Sjöström and Thomelius (1999).

[112] The stick was sometimes replaced with a car tire, which was less dangerous but unattractive from a recreational perspective.

[113] The technique is found on other islands and on the mainland. On Mafia, for example, it is referred to as *wando* (Andersson and Ngazy, 1995)

hundred metres and was accordingly clearly visible from land[114]. The right to build an *uzio* on a particular sand bank belonged to an individual or a family. This was an informal right well-established within the community border (Tobisson *et al.* 1998). I am not aware of any example where the removal of this right, i.e. a hotel investor asking an owner to remove or to not build a trap, was not compensated for. Another traditional right was the exclusive right to fish in a certain area. At a community level this customary right was well-defined in all aspects, but on several occasions tour operators marked the sites with buoys and asked fishermen to leave (Dahlin and Stridh, 1996). Fishermen were occasionally given some sort of *ad hoc* compensation but were not invited to negotiate.

The reason compensation was issued for the removal of an *uzio* and for seaweed farms but not the removal of the stick marking the coconut husk or loss of access to a fishing ground, was that the right to the *uzio* and the seaweed farm received specific formal protection. It stems from 1965 when the government vested all land in itself[115] but the old land laws affecting developed land were preserved; the decree stated "*not to affect the existing rights or interest of any person in any development that has taken place on such land*". These rights were preserved in the next tenure law in 1989, but instead of rights or interests the word "ownership" was used. It was defined as referring only to the development on the natural land or anything connected with or incidental to it. This means that a private person or persons claiming "ownership" of land might claim it only in relation to the *useful man-made developments* on the natural land that is owned by the government (Jones, 1996). The building of an *uzio* was extremely labor and capital intense and would definitely be considered a "useful man-made development", which the fisherman with the exclusive right to fish in a creek cannot claim. Similarly, a seaweed farm may be considered a "useful man-made development" while the stick to mark the coconut husk may not. Let us look more closely at why this formal law was enforced but not that of denied access stipulated in the land use Plan and the Tourism Zoning Plan.

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[114] The fence is accordingly a major building and constructions highly labor intense. The fence lasts for approximately six months.
[115] By enacting Presidential Decree No. 13 of 1965.

Enforcement

The four production activities discussed above were all covered by formal protection but only the group consisting of "useful man-made developments" was enforced. One distinct difference between these two groups is that a useful man-made development is easily defined and the value more easily estimated. The law from 1965 was probably instigated as a means of securing the value of developments and providing incentives for investments. Compensation for "denied access" is attached with uncertainties of both definition and estimation of lost value. There might for example be cultural differences in the perception of exclusion and sharing of a resource. Even when it is clearly formulated that the villagers' access to all zones should be preserved and that they should not be forced to move any activity, the loss in value due to relocation can be difficult to estimate for the villagers due to uncertainties of the consequences. Take the example of a villager who is asked not to dry seaweed on the beach outside a hotel. They might at first, place it a few meters to the right of the hotel area and then be asked to move it again when the next hotel is established. They might not estimate it to be worth getting compensated for, but when the whole beach area is occupied by hotels and they have to bring the wet and heavy seaweed all the way into the village, the marginal cost of being denied access is very high. At that point it is economically justifiable to raise complaint about denied access, but the problem might then be too costly to solve. There is accordingly a threshold level, above which the cost to the villager suddenly increases drastically and below which it has a "sneaking" character where it is difficult to measure. If the villagers have no previous experience of these types of incidents and their consequences it is less likely the villager will react before the threshold level is reached unless they are informed by a third party.

Accordingly, formal regulations created when the tourist industry entered that were not part of local reality (such as the one for unrestricted access), were less likely to be enforced. The decree of "useful man-made buildings" was already an integral part of customary law and therefore it made sense for the villagers to demand compensation and raise complaints. This is for example illustrated in the customary

way of taking over *shamba* land. The traditional procedure was to simply clear idle land and thereby acquire temporary rights to it. However, if land was fenced-in by some sort of permanent or semi-permanent structure, the prospector had to find the former owner and ask for permission to take over the *shamba*. Compensation was then in line with the formal law of the "useful man made development" issued based on the cost of the erection of the wall (Krain et al 1993) [116]. The strength of the man-made development restriction in formal and customary law had the perverse effect that a person with the right to build an *Uzio* which was no longer profitable was compensated for not building one, something he might not have done anyway, while a fishermen or a women burying coconut husks was not compensated though actually losing an important source of income. On a similar note it was reported that women started to build seaweed farms outside of plots bought by foreigners in the hope of being compensated when the hotel was erected[117].

Enforcement of formal restrictions was accordingly facilitated if the restrictions were already an integral part of customary regulations. Important also is that enforcing the restriction should be accessible at a cost smaller than the estimated loss of not processing it. For rural people in developing countries, the cost of going to town and finding the right officer may easily exceed the short-run cost of subsistence activities. Although institutions created to assist in protecting the rights of the villagers as described for the compensation of land facilitated enforcement, formal institutions can also complicate matters and increase the cost of processing. The first tourist plan for Zanzibar was drafted in Madrid in 1983 by UNDP and WTO[118] and a number of foreign consultants were hired to set up the industry including the design of formal institutions. The new plans and strategies for tourism were formulated from outside, but the Zanzibar government simultaneously made preparations for a new land tenure system. The lack of integration between strategies and laws and the existence of contradictory regulations created several loopholes for corrupt activities

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[116] There were several different wall structures for different prices. A wooden wall might, for example, last for only a few years while a stone wall might last for generations.

[117] This illustrates the classic Coase theorem stating that with positive transaction costs property rights alter resource allocations. In "The Problem of Social Cost" (1960) Ronald Coase shows that only in the absence of transaction costs does the neoclassical paradigm yield the implied allocation of resources.

[118] WTO Publication (1994).

and undermined the villagers' ability to secure their rights by increasing the cost of processing and the risk of failure.

That formal protection was not enforced if it did not provide meaning in customary law and local reality can be exemplified by the managing of other goods and sinks. The reason the management of these were not institutionalised earlier can be that they did not exist before tourism entered or that their impact only became relevant after a certain threshold level was reached. One example is beach erosion where the Guidelines for Tourism in the National Land Use Plan state; "*all buildings must be constructed at a minimum distance of 2 m from the property boundary and the first 10 m from the top of the beach are reserved as easements for the public*". In the Tourism Zoning plan it is stated that *No plot boundary may be surveyed and demarcated closer than 30 m from high tide watermark on sandy beach areas or 10 m from high tide mark in rocky areas*. The lack of customary regulations regarding this is evident in that it was mainly local guesthouses that had problems from being constructed too close to the water line (Benjaminsen and Wallevik, 1998). Explanations as to why foreign-owned hotels in general followed regulations and built far enough away from the sea[119] might be because the hotel owners are more aware of the problem and more controlled by the authorities. Other similar examples where the villages had little experience of management methods above a certain threshold level were sewage treatment and waste handling, which after the entry of the tourist industry has become a huge problem.

The above is closely linked to the next distortion of the Nash bargaining solution, i.e. the underlying explanation for why the solution in Equation 4 might not be the outcome in a real negotiation situation, namely asymmetric information. When the respective players have different information of the outcome of the deal in a non-cooperative game the solution will be in accordance with the player who is best informed of the outcome.

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[119] This is not always true, however. When beach erosion took place the large foreign-owned hotels tended to fill up the beach by mining somewhere else, aggravating the problem there instead. In an interview with a hotel manager of a luxury hotel he stated that about 20-25 lorries of sand were needed to fill up "their" beach. Sand was mined at an isolated beach and if the workers were caught, bribes were paid.

Asymmetric information

The villagers on Zanzibar were in general able to refuse a deal below the initial point (v_1', v_2') for the e_L zone and for the ownership of "man-made constructions" in the other zones. This means that negotiations for prices were initiated. Did they result in the solution estimated in Equation (4) where the price equalled the shared value of the profit and the value of land?

First of all note that when the investor started to negotiate with the village or individual villagers, two different norm systems met in a non-cooperative bargaining situation. For the e_L zone this resulted in asymmetry for the definition of the good that was sold. The villager sold the *use value* of the *trees* while the investor bought the *land area*. The customary way of valuing land was by its usage and ownership was attached to the productivity of land. If land was not used for production the person lost right to it[120]. Consequently, an individual could plant trees sparsely[121] just to secure the right to a given area.

Traditional norms thus appear to offer protection for the concept of tree ownership as an expression of ownership for land, but when the deal was settled (in a non-cooperative manner) the investor's interpretation of having bought the actual land (and not just the trees) was the interpretation that was supported by national legislation and government agencies. When a third party supported the investor's definition of the good his expected outcome was realized. With repeated negotiations the villagers realized this and the definition of the good changed from ownership of trees to ownership of land plots. This does not necessarily mean that the communal norm system adopted the new definition of the good. The ownership of the trees at the time was individual and impersonal but the ownership of the land beneath was communal. The ownership of trees was similarly attached with other "informal" rights such as the right to build a house (Caplan, 1975, 1978, 1997), a symbol of status and often used as a security by women in case of divorce[122]. This section

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[120] Formal law was constructed in a similar way requiring maintenance of property otherwise the government had the right to expropriate the land. This is another example where formal restrictions have become an integral part of customary law.

[121] Coconut trees were traditionally under permanent cultivation with the rotation of food crops and only a short fallow period (Sheriff, 1987).

[122] This is illustrated in Caplans more recent (carried out in 1993) anthropological work on Mafia;.... *But to make things worse, Mohammed had few coconut trees left [*Mohammed had emotional and financial problems*], having gradually sold off his inheritance, for a variety of reasons, and had never planted any himself. Indeed Mwahadia* [his ex-wife] *had told me that he had sold all his coconut trees now and had nothing left. If this were true; it was something Mohammed was reluctant to admit to me, since in the village, selling coconut trees, the main source of capital was always regarded as a foolish*

will elaborate further on the difference between making individual gains and changing social norms and communal institutions.

Private gains or harmonizing the communal system

The institutional set up in the villages prior to the tourist industry was described to be a stable cooperative system that at the same time was vulnerable to external disturbances. Continuous cooperation between members was threatened by changes in the payoff structure and reduced expectations of future interactions. Consequently, continuous collaboration was sensitive to changes in relative prices, new economic opportunities, changes in sanction cost (issued when deviating from the system) and the above-described asymmetry in information; the latter because individuals who accumulated information were able to improve their payoff. The entry of the tourist industry implied all these changes and it simultaneously widened the market access reducing the number of repeated encounters between villagers.

In the example of selling trees, individuals who owned the trees in recreationally attractive areas became relatively more affluent due to changed relative prices. Within this group some individuals started to sell land as one piece and not by number of trees as was the tradition. But institutions and norms change slowly and within the village sphere the definition of land remained in the form of ownership of trees. Whether the norm system is able to change while preserving the collaborative framework depends on a number of factors. The ecological characteristic is one such factor and some historical examples will illustrate this.

When land was vested in the government[123] after independence, some individuals started to cultivate land already distributed by the group of elders (in according with customary law)[124], claiming their right based on the fact that it was now government land (Caplan, 1975). In cases where the dispute led to government

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move, a short term solution which would certainly leave longer-term problems in the train" (Caplan 1997, pp. 211).

[123] Land tenure reforms were top priority after the revolution in 1964 and already one month before the union with Tanganyika the new Zanzibar government revolutionized the land laws and vested land in the government (Jones, 1996).

[124] The ownership of *shamba* was divided between the *ukoos* (the extended family) in the village and the elders of each *ukoo* distributed the land to its members each year according to a rotation system and the special needs of the family members. See for example Caplan (1975) for a detailed description of distribution of plots within and between different *ukoos*.

interference the "norm-breaker" was commonly given the right. During this time scarcity of land increased[125], and the payoff from deviating from the norm system increased (Caplan, 1975). This resulted in an institutional transformation where ownership of *shamba* land was individualised. Clearly marking borders and fencing in property protected it through the "useful man-made development" clause. Singer (1996) observed that *shamba* owners had developed thirteen different techniques for demarcating boundaries[126], which was demonstrably different from the situation that Middleton found in 1958 when there were not many well-defined boundary lines[127]. Ownership of land was still informal, but with the fence it was formally protected and individualised holdings were secured through internally enforced codes of conduct and social norms. The change to individualised holding made it more profitable for the members to collaborate than to deviate from the system[128]. This is confirmed in a recent study concluding that boundary disputes were rarely taken to court but settled by the local branch of the CCM[129], the disputants themselves, or the village leader, the *sheeha* (Singer, 1996).

Above, the evolution of institutions for *shamba* land led to individualised holdings and continued collaboration, but vesting land in the government resulted in a different outcome for other ecological zones. The prawn (*kamba*) fishing in the mangrove in Mapopwe Creek is an example of a common property resource that used to be regulated using closed seasons. Two villages maintained this management system jointly and the area was closed for fishing for a period of 2-3 months between the short and the long rains each year, which is the time when the prawns hatch. The closure time was ritually announced and violations of the system were rare since

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[125] Singer (1995) reports that scarcity of land increased since 1958 when Middleton (1961) described the institutions existing then to have been formed due to low competition for land, which is similarly reported by Caplan (1975). Improved mobility and increased migration particularly increased the value of land adjacent to urban centers where a growing number of individuals wanted a *shamba* near town.
[126] These include a utilization of: *mibono* trees, stones, coconut trees, roads, pathways, fences, banana plants, cut or dead wood, crops, clove trees and a variety of "other" physically present items.
[127] Middleton (1961: 75) in Singer (1996).
[128] The preferences for individualized holdings was confirmed when the government wanted to promote the cultivation of cassava in the beginning of the seventies, setting aside land for this purpose. The government was, in accordance with the prevailing political ideology, anxious to promote cultivation on a communal basis but the villagers strongly resisted this. Eventually the government agreed to divide land into individual fields where rights had nothing to dowith descent group membership, as was traditional (Caplan, 1975).
[129] *Chama Cha Mapinduzi* which was the ruling political party in Tanzania.

abuse was easily detected, mainly because everybody knew each other but also because only one market place was accessible. The marketing situation changed when the road to town was improved and the area became an administrative center (Chwaka) resulting in an influx of newcomers. This combined with the weakening role of the group of elders[130] resulted in a collapse of the system and within a period of 15-25 years, the prawns had vanished (Tobisson *et al*, 1998). Consequently, while changed payoff structure caused the e_S and e_L zone to evolve from communal ownership to individual and impersonal ownership although continuously secured and protected within the village framework, the e_M zone evolved into open access since no alternative institutional structure that preserved the cooperative equilibrium was available.

Accordingly, external shocks that change the payoff structure or other important factors such as ability to sanction or survey can either lead to an institutional adaptation to the new situation that preserves the cooperative framework or it can result in a collapse of the system.

Asymmetric bargaining ability

What was the outcome of the negotiations for land or trees? In the initial stage the Ministry of Agriculture issued a compensation list (in 1988) where a productive coconut tree was valued to 380 Tsh (about USD 1 in 1990)[131]. This was not in use very long but compensations remained low and could hardly be considered in accordance with Equation (4), i.e. the shared value of the profit and the value of land. In the early 90s the trees were sold for about 3 000 Tsh (about USD 8) per tree and in 1997 for 60 000 Tsh per tree (about USD 100) (Benjaminsen and Wallevik, 1998). Repeated negotiations improved the bargaining ability and the payoff increased. This can be interpreted as a decreased difference between α and β in Equation 6. Other indications of improved α were that the format of the agreements changed to better accommodate the needs of the villagers. Agreements could for example include the

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[130] This is also an example of breaking one of the fundamental and necessary principals of the design of sustainable common property resource mechanisms that Ostrom (1991) addresses (principle 7 in Ostrom's list of seven principals).
[131] Dahlin and Stridh (1996).

right to continue to use the produce of the coconut trees that remained after construction or, for the same reason, to not sell all trees on the plot (Benjaminsen and Wallevik, 1998)[132]. In effect it means that $r(0)$ was increased and accordingly the total payoff from the deal was increased. To improve the payoff, negotiations were sometimes handed over to a third party believed to have better negotiation skills. With increased bargaining ability villagers felt adequately compensated for selling the plot as opposed to many who sold in the early development stage who felt less satisfied (Benjaminsen and Wallevik, 1998, Dahlin and Stridh, 1996).

It was observed that the price of a plot was lower when sold to a local villager compared to when sold to a foreigner, but that the villagers preferred to sell to other villagers. Why was this?

Bargaining power

Baland and Platteau (1996) state that there is increasing evidence to show that when traditional authorities are no longer performing/are questioned, and/or when collective actions are better taken at a lower-than-village level, co-operation has a better chance to succeed if group leaders are relatively young and educated. That preferably has been exposed to modern values and ways but do not squarely confront or antagonize traditional structures or authorities but find tactful ways to collaborate with them. Caplan (1992) provides an example along these lines, describing how a local government official was to be installed in a small village on Mafia[133] after independence. The first incumbent was a youth from the south of the island. He was soon replaced because not only was he an outsider, but the villagers resented being told what to do by a youngster. The second in line was an older southerner, but he was arrogant and did not pay respect to the villagers' needs. After a few months, to everyone's relief, he was transferred and replaced by another officer from the south but one who originated from the village who turned out to be a very tactful person.

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[132] A coconut tree takes about seven years to start bearing, and then it continues to bear nuts for about 80 years. The trees provide a valuable stream of products for food and cash (copra, coir, cooking oil, wood, building fronds, matting and other uses) (Caplan, 1978, 1997).
[133] Mafia is an island south of Zanzibar that has considerable economic, social and cultural interactions with Zanzibar.

The tension in the village was lowered and the government project[134] finally started to make some progress. This kind of person with one foot in each culture, who cooperates with both sides, is important for stability in times of transition.

One plausible explanation as to why villagers prefer a local investor is that he will be an asset to the village and increase their bargaining power. A tactful person with local knowledge and connections who relies on cooperation with the villagers can provide the whole village with bargaining power. The local investor becomes an important mediator and bargaining partner vis a vis the "new world" for the village and its members. The underlying reason is a mutual dependency where the local investor depends on the cooperation of the community to successfully carry out his business and the village preserves certain integrity vis a vis the new industry. A consequence from this is that it slows down the speed of institutional transition. Changes become less abrupt and it is more likely the norm system in the village adapts rather than that the collaborative framework collapses[135].

A considerable number of the investments in the tourist industry in Zanzibar were local initiatives. What implications did this have?

Local villagers' participation in the industry

The distribution of local investments varied between villages. In some villages small locally owned guesthouses eventually dominated the whole beach area[136] while in others there were only a few or none[137]. Based on data of visitors from 1996 and 1999 about one-third of the total number of visitors to Zanzibar can be characterized as low-budget visitors[138]. Even among the larger projects, 33% of the total number of investments were registered as domestic[139]. This appreciable participation of local

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[134] Caplan (1992) refers to the early socialist phase here and the main mission for the officials was to organize and set up self-help projects, such as building schools, setting up communal cultivation schemes etc.

[135] Baland and Platteau (1996) similarly found that cooperation was best established when it was developed in a gradual way, starting with rather easy-to-meet challenges and then moving to more complex situations requiring more trust and collective discipline.

[136] Examples are Jambiani and Paji and, to a lesser extent, Nungwi.

[137] For example, Kiwengwa on the East coast.

[138] The distinction between a budget traveler and a luxury traveler is not straightforward, however. The figure is based on information of average daily spending from a data set in Andersson (2004)

[139] Larger (financial) investments had to be approved by ZIPA and statistics for this group are more reliable since they entailed a larger bureaucratic procedure compared to smaller investments This

villagers in a new and unfamiliar industry is somewhat unique. Middleton (1992) described the coastal Swahili communities as possessing a typical institutional flexibility when it came to new economic opportunities.

Thanks to the accessibility of the sea, the villagers had a rather broad social and trading network and the export of cash crops, manufactured goods and labor had always been an important part of the coastal dweller's economy[140]. Groups were formed when new opportunities came up and new rights then came to be held by them. This flexible and irregular structure and ability to adapt to new opportunities was similarly described by Benjaminsen and Wallevik (1998) and Tobisson *et. al.* (1998), and by Caplan for Mafia (1975, 1978). What specifically characterized the institutional set-up was a typical looseness in defining the members of a kin-group or other subgroups; groups which in turn determined access, ownership and participation in production activities[141]. This resulted in efficiency in responding to changes and opportunities while at the same time maintaining a high level of consistency.

The typical flexibility might partly be derived from the fact that descent groups were cognatic i.e. that membership was obtained through both matrilineal and patrilineal descent. This means that if an individual's parents were members of different descent groups, the individual had multiple memberships and was able to obtain rights to land and resources through more than one group (Caplan, 1975, 1978). Middleton (1992) raises this point and compares it with societies where rights in land and property are restricted to unilineal descent groups. Here the very exclusiveness of the group means that a person fears losing membership and this fear may provide an adequate incentive for not deviating from the group. Dasgupta (2000) mentions dense networks as a restriction for developing a market economy since it means that a person would not" jump at opportunities" not accepted by the group. This was not the situation in the small coastal villages in Zanzibar where the authority

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number is, however uncertain because it is common that local people are used as a front to facilitate the procedure of getting permits and reducing costs.

[140] See; Caplan (1978,1992, 1997), Middleton (1992), Sheriff (1991) and Singer (1996). For the rural areas this refers to trade within sailing distance and with other Swahili cultures as opposed to urban merchants who take part in the wider Indian Ocean trade.

[141] To illustrate; the smallest kin group was the *mlango*, holding close residential and garden rights, the *tumbo* was wider, with less narrow rights and the *ukoo* was wider still often holding potential rather than presently enjoyed rights. When property was new and of the kind that produces commodities for exchange outside the *tumbo* it was likely that the *tumbo* was replaced by a *mlango* (Middleton, 1992).

within groups was minimal and group structures and ownership flexible and adaptive. Different sorts of skills and personalities could with minimal search and information cost and maximum trust, be combined to invest in the tourist industry.

The great local participation in the industry accordingly created two different players for the village to negotiate with; the local guesthouse owners and the foreign-owned hotels. The fact that the bargaining power related to village issues was stronger vis a vis the local investor meant that the outcome in negotiations differed between the respective investors.

Bargaining power and different outcomes

The villagers who invested in small guesthouses were often the villagers who owned the trees closest to the beach. They belonged to the *ukoo* that first settled in the area and were in general slightly better-off than the *shamba* owners (Benjaminsen and Wallevik,1998, Caplan, 1975)[142]. Guesthouse owners could also be urbanised relatives who originated from the village and returned to buy land and invest. In both cases, local attachments were in general stronger compared to foreign investors, at least in the beginning. The pay-off from cooperating or deviating from the traditional system was for the local guesthouse owner a function of several variables including increased knowledge of tourist preferences, less dependency on village support and increased support from the government.

In the early-development phase, local investors were less aware of tourist preferences and the pay-off from breaking with the local norm to adjust the business accordingly was estimated to be low. One example of this was the response to local production activities occurring in recreationally attractive zones. As described earlier, foreign investors attempted to remove these activities but local investors rarely did. A study observed that local guesthouses tended to explain to the guests about the different local techniques and activities; in certain areas a pattern of mixed usage of the intertidal zone was achieved where the tourists used it at high tide and the local

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[142] The explanation Caplan (1975) gives is that the crop in the *shamba* ripens earlier, which necessitates buying staples for cash earlier. During this period, however, coconuts and cashew nuts, which only grow in the meadowlands were highly profitable cash crops providing considerable economic benefits to their owners (Caplan, 1992, 1997).

resource users at neap tide (Benjaminsen and Wallevik, 1998). Local production strategies for income and subsistence were of extreme importance to the villagers and attached with deeply rooted institutional constraints (Tobisson et. al. 1998, Andersson and Ngazy, 1995, 1998). It would be very costly for local guesthouse owners to attempt to remove these.

Another example of different ways of dealing with the business is that of fencing in property and denying access to land. This was not done by the local guesthouse owners, but frequently carried out by foreign investors and was a commonly expressed concern among the villagers[143]. As described earlier, the land area under the privately owned trees was according to local tradition open to communal access and was used by village members for work and social activities. Singer (1996) for example observed no case where a local and private owner of *shamba* land tried to block off a traditional pathway or had any problem with people trespassing on his/her land[144]. Even water resources, such as a well, were always shared. Singer (1996) in his survey of several villages did not observe one single case where an individual was denied access to a local, privately-built well.

Additional examples of local investor adaptation to local needs can be found in differences in employment terms. Local guesthouses in general offered flexibility in working hours such that traditional and complimentary income sources could be simultaneously maintained. Working hours at foreign-owned hotels (shifts of eight hours) were badly adapted for maintaining certain production activities and to the customs of the villagers who pray six times a day. Some locally-owned guesthouses also preserved a religious stance by not serving alcohol and by informing in words and signs that the visitors should uphold a certain dress code.

The local guesthouse owner's adaptation to local institutions meant that the pay-off structure for the individual members of the community changed less abruptly compared to changes induced by foreign hotels. An example is the effect on the fishery from changed demand. Foreign hotels demanded specific species while local

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[143] Several studies mention this as an important inhibition for the local resource users; Benjaminsen and Wallevik (1998), Dahlin and Stridh (1996).
[144] Whether the land was inherited, purchased, cleared, borrowed or given had no bearing on its accessability.

guesthouses adapted the menu to local catches (Stenborg and Eriksson, 2002)[145]. The relative price of the products typically demanded by the foreign hotels increased dramatically and fishermen changed their production habits and specialised in certain species (Andersson and Ngazy, 1998). This had detrimental effects for the survival of some products. Lobster was for example almost inelastic in price for tourists and became fished to the point it became severely threatened (Bakari and Andersson, 1998).

In sum, locally-owned guesthouses to a larger extent adjusted their activities to suit local habits, customs and working conditions, something the villagers often complained the large foreign-owned hotels did not. The underlying reason was the larger attachment of the local investors to the village system, which made it profitable to collaborate, at least up to a certain point. What were the implications for the local investors from adapting business to local institutions?

Ownership, bargaining power and the trickle-down effect

The decisive question is whether local investor adaptation of the business to the traditional norm system resulted in a larger trickle-down effect or was just an impediment to development. Nilsson and Egriell (1998) compared foreign-owned luxury hotels with locally-owned guesthouses in a small village in Zanzibar[146] and estimated that the money flow to the adjacent village as part of the total turnover was 2% for the luxury hotel and between 21-65% for the small guesthouses. In absolute figures the difference was insignificant since the yearly turnover was considerably larger for the high-class hotels. On a macro level the result is uncertain. Foreign investors tended to buy products elsewhere, at larger and more reliable market places. They also imported more goods to accommodate their visitors' tastes. In general, capital generated by foreign-owned hotels has a larger tendency to leak out of the country (Pearce, 1989).

Indications of a larger relative trickle-down effect in Zanzibar was emphasized in a survey asking the villagers if they felt they benefited from living close to the tourist area. About 40% on Zanzibar responded that they *did not*, which is high, but it

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[145] Foreign hotels typically demanded large-sized fish, pelagic species and crustaceans.
[146] Nungwi village, on the northern tip.

was much less compared to the two other surveyed areas in Tanzania. In Bagamoyo 61% felt they did not benefit and as many as 80% in Arusha did not feel they benefited (Kulindwa *et. al.* 2001). The same study observed that relatively more individuals were employed in non-resource dependent activities such as tourist guides on Zanzibar. Andersson and Ngazy (1998) estimated that individuals who combined new and traditional income sources earned the highest aggregate incomes; for example combining fishing with a non-resource based activity brought earnings of 160 000 Tsh /month compared to specialising in fishing which brought about 120 000 Tsh/month. The strategy of combining resource-related activities with non-resource related activities was new[147] and the main non-resource related activity was triggered by the tourist industry. Foreign-owned and high-class hotels employed very few locals. They demanded skills and experience in producing recreational services that created restrictions to entry for the local people[148]. The fact that locally-owned guesthouses allowed individuals to maintain traditional activities while gradually entering into new non-resource dependent activities meant that restrictions to entry were reduced.

Another effect was that social, cultural and institutional costs were smaller and less abrupt when local investors also participated in the industry[149]. Gradual changes allowed for adaptation instead of a breakdown of the traditional norm system.

While there seems to be evidence for a larger percentage of trickle-down when local guesthouse owners adapted business to local traditions, the question remains as to which mix of local and foreign investment is preferable. Based on the figures given above, the choice between a 2% local trickle-down from say $1000 and a 50% from $40 is far from obvious. In favour of the latter, local developments seem to be more sensitive to local norms and thus implies smaller costs of cultural and social disruption. On the other hand, the much larger profits the typical international investor

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[147] Apart from the traditional activities of administrative or religious character that had always existed in combination with other resource-related activities.

[148] That few local people were employed by foreign-owned industries was concluded in numerous studies; Dahlin and Stridh (1996), Benjaminsen and Wallevik (1998), Nilsson and Egriell (1998), Stenborg and Eriksson (2002), Kulindwa *et. al.* (2001). Even in the construction phase, which required a large number of employees, high-class hotels often brought in workers from outside (Benjaminsen and Wallevik, 1998).

[149] The environmental costs are uncertain since local ownership results in both positive and negative effects.

generates are tempting to the decision maker who can at least hope that the trickle-down percentage will increase in the future as markets, legal systems, bargaining power and taxation rules develop.

In addition, the two forms of investments may be complimentary in an important way, which would lead to speak not of one type of investment as preferable but rather of how to aim for an optimal combination. Certain adaptation to the need and preferences of the tourists is necessary for remaining in business. Local investors have to a larger extent relied on foreign investors to market Zanzibar as a tourist destination. The local guesthouses compete among themselves for the customers who have already made the decision to visit Zanzibar[150]. Foreign investors provide access to international networks and knowledge of the industry. Gradually this could be transferred to the local guesthouses and more advanced forms of local ownership be developed as know–how and capital accumulate.

Findings and Policy implications

Factors identified to be conducive to compensation and trickle-down are summarized in Table 1. The last column outlines policy implications from the findings.

As a minimum requirement for participation in any negotiation for compensation the villagers must have a credible disagreement strategy i.e. be able to refuse a deal. The first two rows in Table 1 are concerned with this. The example of Zanzibar showed that improved access (short distance) to decision makers improved the protection of formal and informal rights. This together with institutions installed specifically for dealing with compensation issues enhanced the ability to refuse a deal, at least for land.

Large efforts to design formal laws to protect the rights of the villagers were fruitless if they were not an integral part of customary law or if they did not make sense in local reality. Particular attention therefore needs to be given to goods and sinks where the villagers have no previous experience. This is particularly so if the

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[150] This results in herds of entrepreneurs waiting at the airport and the harbor to convince new arrivals to stay at their guesthouses.

cost to the villager is apparent only after a certain threshold level is reached and thereafter is considerable.

The village framework was based on close collaboration between members and was simultaneously sensitive to external shocks that changed the pay-off structure and induced individual members to deviate from collaboration. Resources subject to communal ownership and control were particularly vulnerable to external disturbances. If no alternative management structure could replace the governing of the common property resource it ran the risk of turning into open access. Studies have shown that it is often the poorest households in society that depend on common property resources[151] and since an easily identified bargaining agent was conducive to compensation it seems particularly important to designate (identify and empower) appropriate spokesmen or agents empowered to negotiate on behalf of the community for communally governed resources.

Another important aspect for the ability to refuse a deal was that the courts, politicians, lawyers and other relevant institutions were accessible to the villager at a reasonable cost[152]. For poor villagers this implied that the cost of going to town could deter them from processing a case. Particularly vulnerable and exposed groups might accordingly need third-party assistance for even initiating their cases.

Discrepancies in the respective norm systems of the villager and the international investor (especially in the initial period) resulted in a distorted bargaining situation. In a non-cooperative game where the players act in accordance with two different norm systems they actually play according to different sets of rules. Consequently, they expect different outcomes or "solutions" to the game. This results in a type of asymmetric information where the player with information of the actual outcome receives his expected pay-off. Norm systems and customs change more slowly than individual responses to changed relative prices or new opportunities. Continued collaboration between village members and communal adaptation to the new norm system is more likely to happened if changes are gradual. The development

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[151] See for example Jodha (1986, 1995) and Cavendish (2000).

[152] This coincides well with the results emphasized by Ostrom (1991) that common property resource management at the local level cannot operate well without at the very least tacit support from superior legal systems.

after the entry of the tourist industry was therefore assisted by the considerable participation of local investors who restricted the speed of change and smoothed the transition. Another solution to this could be to assist the villagers in negotiations, especially in the early period, with an arbitrator that removes the asymmetry in information.

Factors conducive to compensation and trickledown	Facilitated by	Distorted by	Policy implications
Ability to refuse a deal	Short distance to decision makers.	No interaction between village and decision makers.	Design institutions specifically to handle compensation issues.
	Private, impersonal ownership.	Difficult to identify bargaining agent.	For communally governed resources identify or appoint representative agents.
Enforcement of formal or informal restrictions	Well-defined rights	Situations where costs have threshold level.	Clarify property rights, regulations, plan early.
	Formal law is an integrated part of customary law and local reality.	Lack of prior experience	Particular attention to pressures where villagers have no previous experience.
	Easy and affordable access to legal and political assistance.	Long distance to town. Corruption	Administrative reform. Facilitate procedures for filing complaints. Identify and assist particularly vulnerable groups.
Harmonized norm systems	Repeated negotiations as a learning process	Top-down decision-making	Use of third-party arbitrators
	Local participation in the industry.	Complete areas taken over by foreigners.	Encourage and support local investments.
Enhanced local bargaining power	Entrepreneurial tradition part of local culture.	Lack of human and financial capital.	Encourage and support local investments.
	Large proportion of local investors acting as mediators.	Foreign owned hotels dominate the village.	Gradually empower the villages. Make investors depend on good cooperation with the village.

Table 1. Factors conducive to compensation and trickle-down.

In order to enhance the welfare of the villagers they need not only the power to reject bad deals, they also need to enhance their bargaining ability. This is done partly through the harmonization of norm systems described above and partly through the growth of local know-how and capital as suggested by the lower portion of Table

1. The small locally-owned guesthouses that popped up in numbers in Zanzibar had an important role to fill. Local investors were initially players in the cooperative village framework and in general less knowledgeable of the new industry. It is reasonable to assume that they had a stronger attachment to and dependency on cooperation with the villagers, which provided the villagers with stronger bargaining power, vis a vis the industry. This increased bargaining power materialised in less interference with local production activities, a larger generation of employment opportunities and more of a tendency to protect traditional and cultural norms. It also smoothed the transition and helped to achieve more of a gradual harmonisation of the new institutional frameworks. In sum it is suggested that certain participation of local investments in the establishment of the industry can imply larger trickle-down effects and smaller cultural and social costs for the local village.

What are the policy relevant lessons from the case study? What strategy should a country that decides to launch tourism as an industry pursue? The formal aim of the government of Zanzibar was to invest in "first-class tourism" since this was perceived to best enhance economic gains (Dahlin and Stridh, 1996). The authorities were so convinced of this that they were even suspicious of highly advanced yet ecologically adapted projects that did not carry the typical characteristics of a luxury hotel (Sterner and Andersson, 1998). In the case of Zanzibar, there appears to be a natural advantage in that the population has an entrepreneurial spirit and people easily form flexible business groups resulting in comparatively large numbers of local investments despite little governmental support. The truth is of course that there is no simple relationship between the commercial/local characters of investments on the one hand and welfare or trickle-down effects in the villages on the other. If the local entrepreneurs are hampered in their ability to adjust to the preferences of the customers, they will eventually fail. The two types of investments are not substitutes for each other; they rather target different segments of the market by producing different types of goods. Foreign investors are important in providing know-how and capital while local investors secure local integrity and local participation in the industry.

Initially, local institutions need support. Since foreign investors predominately depend on good cooperation with the government, the incentives to cooperate with the villages may appear small. It is therefore important for governments to make clear that they require such local collaboration while the governments themselves should gradually, as knowledge and understanding evolve, empower the villagers in decisions related to the use of land and resources within village borders. This would imply that foreign investors would also come to depend on cooperation with the villagers, providing incentives to accommodate village needs. In conclusion, by gradually shifting the bargaining power to the local villagers, they can secure a share of the economic potential the industry provides and secure participation in its development.

Glosssary

Kamba	Prawns
Shamba	Land plot used for agriculture
Sheeha	Village leader
Ukoo	Extended family
Uzio	Fence trap used for fishing
Watu wane	Group of elders

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