Are International Development Projects Unfair to Local Staff ?
Dynamics of the Dual Salary Scale Question

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Abstract

Internationally funded projects typically use two salary scales: one for internationally recruited staff and a lower one for locally recruited staff. The fairness of this approach has been questioned particularly when staff members have the same training and carry out similar tasks. Administrators argue that they pay the appropriate salary, based on local wage scales, and that locally recruited staff are under no obligation to accept the positions offered. Also, higher salaries offered to local staff would drain talent from other local employers. Others argue that such unfair treatment undermines the collegial atmosphere desired in such projects, and that a more equitable salary arrangement should be adopted. Complicating this question are many peripheral factors.

A system dynamics model might help clarify the problems created by a dual salary scale system and provides insights which might help formulate a better system.

INTRODUCTION

Dual salary scales are commonly used in internationally funded multilateral and bilateral projects. Usually there are nationally recruited and internationally recruited staff. Both are paid somewhat above what they would be paid for similar jobs in their own country and, often, formally defined salary scales exist for each group.[1] In the past, senior and technical positions were filled mostly by international staff because adequately trained local staff were scarce. Lower level managerial and secretarial staff were filled with local personnel.

Nowadays things have changed. National universities may be well developed and national graduates well qualified.[2] National staff may have advanced degrees from internationally recognized universities. National staff are hired both for their technical expertise as well as their, often superior, knowledge of local situations. For this reason a dilemma arises: should well qualified national staff be paid the same as their foreign counterparts, or is a dual salary scale justifiable.

While real differences in ability and training may exist, an underlying basic question needs to be addressed: in theory should identically trained and experienced local and foreign staff of an international project be paid the same salary, or should each be paid a salary acceptable within their respective home countries? While specific situations are rarely, if ever, this well defined, this question characterizes the key aspect of the problem.

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[1] At least in the recent past, for example, Asian Development Bank loan projects carried out in Indonesia, used "billing rates" which were based on schedules specific to an individual consultant's country of origin. These were (are?) used as a basis for salary and benefits negotiation, and the "overhead" fee available to the responsible consulting firm was essentially the remaining fraction of that billing rate.

[2] Interestingly a number of nations have expatriate staff working at national universities paid under special salary scales as discussed here (e.g. see Ila'ava 1999).

Complicating factors are many. Higher salaries for national staff will attract well qualified staff away from national agencies weakening the abilities of those agencies. Often these agencies will be the very ones which the project is trying to strengthen. This "brain drain" is more serious in situation where few well qualified candidates are available (see for example: Emergency Personnel Network 1998; Humanitarian Accountability Project 2001). In a small country with few well trained individuals one may wish to use only international staff for technical positions. If the country in question is large with many well qualified people then the brain drain effect may be less important.

On the other hand, if many well qualified local candidates are available then would it best to hire more national staff at local salaries? What would be the effect of this approach? Well qualified local staff may be a cheaper alternative to international staff, but if there is a desire to maintain a mix of international and local staff this is a problem too. On the other hand, raising salaries would result in fewer positions or higher project costs or both. Low wages paid to local staff may require these individuals to seek second jobs, perhaps lowering their overall work quality.

Alternatively paying lower salaries for internationally recruited staff would fail to attract the best candidates. Recruitment of substandard international staff may harm project operations and may limit motivation of local staff.
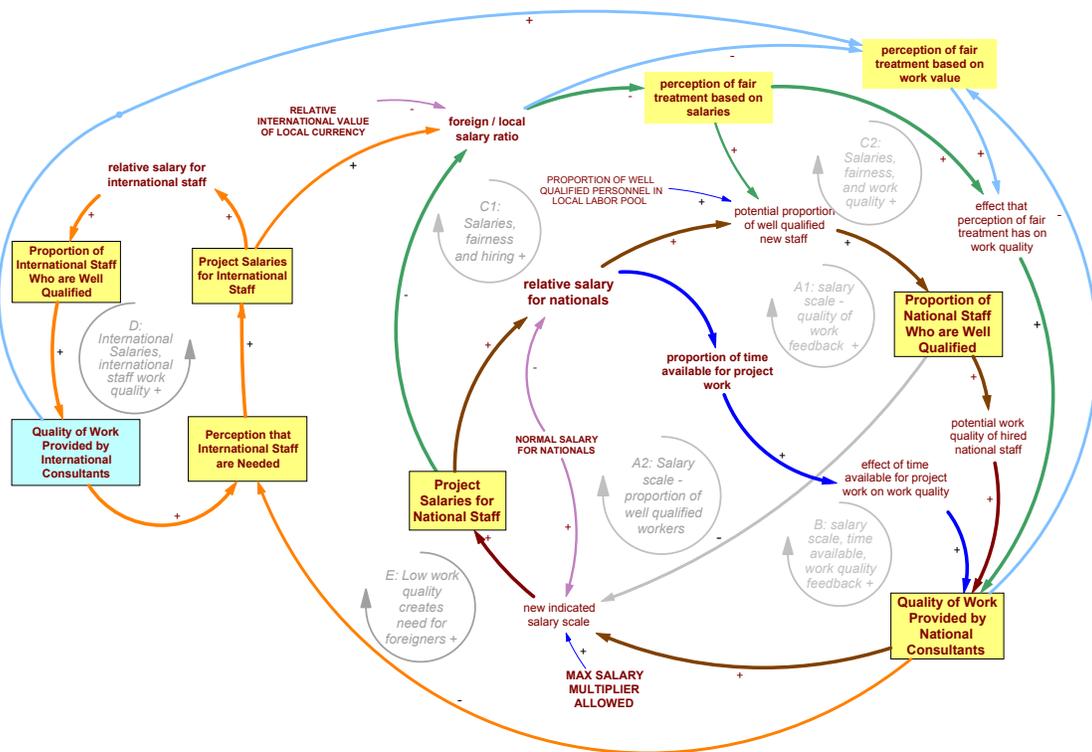
Figure 1. A causal loop diagram of the dual salary scale question. Quality of work of national consultants on cooperative "development projects" is affected by salary relative to prevailing normal salaries (loop A1) which affects the ability of the project to hire well qualified locals. This is complemented by balancing loop A2 which reflects the attitude of personnel directors who feel that salaries need only be high enough to attract good staff. If salaries are very low, local staff also cannot afford to spend full time on the project lowering their work quality (loop B). The relative salaries international consultants also affects work quality of nationals via the effect of perception of fairness on hiring and on work quality (loops C1 and C2). If work quality of locals is low, the perception that foreigners are needed remains high maintaining high international salaries (loop E). This allows continued hiring of well qualified international staff which further reinforces the idea that foreigners are needed (loop D). It is also possible that some aspects of fairness are based on relative work value of national and international consultants rather than salaries (upper right).

Of special importance is the issue of fairness and the effects which it may have on work quality of national staff, the recruitment and retention of well qualified national staff, and the overall work environment for both national and international staff.

MODEL DEVELOPMENT

A Basic Conceptual Model

Figure 1 presents a simplified conceptual model of the dual salary scale problem formulated as a causal loop diagram.   Each pair of components is linked by an arrow with a sign which indicates how a change in one component will affect the other (other things being equal).

The *quality of work of provided by national consultants* is a concern within internationally funded cooperative projects. Projects will normally try to recruit the best available people by offering competitive salaries higher than those paid for similar work within the host country. The assumption is that paying a higher than average salary will attract the best available candidates and this will result in an increased quality of work. This idea is illustrated by loop A1 (Figure 1). In this loop increases in *project salaries for national staff* will ultimately cause increases in the *proportion of national staff who are well qualified*. It is assumed that this leads to better quality of work on the project which justifies, up to a point, further increases in *project salaries for national staff* depending on salary policy which here is indicated by the *max salary multiplier allowed*.   This further reinforces the ability of projects to hire well qualified staff.   In the view of a personnel office loop A2 may be more accurate: salaries need only be high enough to attract good staff.   Better work quality will automatically follow.

However, *project salaries for national staff* may still be low compared to income needs. This is because the *normal salary for nationals* is often very low. If *project salaries for national staff* are sufficiently low than national staff will need other sources of income, probably via second jobs, to maintain their livelihood. However, such additional employment will lower the amount of time they have for project work and will thus lower the overall quality of their work.[3] Decreased time available for project work, which may very well be caused by a legitimate need for additional employment, will nevertheless decrease the quality of work performed and will adversely affect *project salaries for national staff* (loop B).

If the *quality of work provided by national consultants* is perceived to be poor then the *perception that international staff are needed* increases tending to maintain high *project salaries for international staff*.

A large *international/national salary ratio* may erode any *perception of fair treatment* that national staff have. This weakened perception may limit a project's ability to attract and hold good national staff, and often creates situations whereby *quality of work provided by national consultants* already hired is adversely effected. For example, if national staff perceive that they are treated poorly, they may, depending on the local situation, resort to questionable financial methods[4] (loops C1, C2 and E Figure 1).

An increased *perception that international staff are needed* will support high *project salaries for international staff*.   This will allow a project to recruit a larger *proportion of international staff who are well qualified*.   This, in turn, helps to support the idea that *quality of work*

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[3] This is a serious problem on many projects as local consultants listed on project documents as full-time are, in real work terms, less than half time.

[4] Such as requesting *per diem* for travel not taken, and fees for meetings not attended.

provided by international staff is higher than that of locals which further reinforces the *perception that international staff are needed* (loop D Figure 1).

Quantification of the model

A somewhat simplified version of the quantified model is presented in Fig 2. The model consists of seven explicit stocks plus two smooths.[5]

The *proportion of national staff who are well qualified* is dependent on the proportion of such staff in the labor pool, the salaries offered and the effect that salary differentials may have on perception of fairness. The *proportion of national staff who are well qualified* determines the *quality of work provided by national consultants*, but this is also determined, in part, by both the amount of time that workers can afford to spend on the project, and by the perception of fair treatment that the project presents. This latter measure is viewed here as a function of both the relative salaries and the relative work value of national, compared to international, staff.

Quality of work provided by national consultants will affect the longish term salary scales which projects pay. Projects typically pay a premium above prevailing local salaries in order to get the best qualified local personnel. This premium is based partly on the work quality expected of employees, for which work quality of current employees is a proxy. Salaries paid are also based on the qualifications within the pool of candidates that can be attracted by a given salary scale. The hiring office's point of view will be that salaries should be
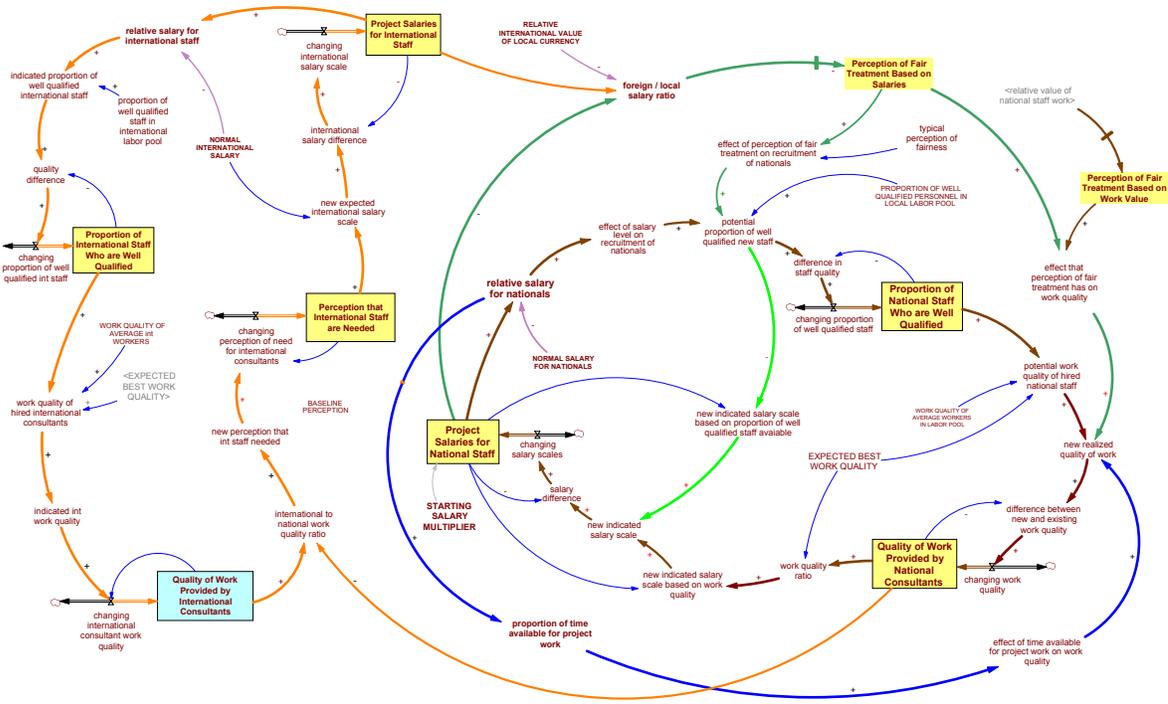
Figure 2. Diagram of quantified model. For simplification a number of model components are omitted.

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[5] Model equations are provided at the end of the document.

sufficiently high to attract the best candidates and no higher. Project salaries will determine, to a large extent, the proportion of well qualified national staff hired.

Because prevailing salaries are low, the *relative salary for nationals* is an important determinant of time that local consultants can spend on a project. A lookup function used here assumes that at prevailing national salaries national consultants typically spend only 40% of their assigned work time on a project, largely because a project assignment is typically viewed as an additional part-time job. This would lead to an overall decline in both work quality, and will ultimately lead to low salaries for national consultants.

Perception of fairness is influenced by two sources: that related to salaries, and that related to value of work provided.[6] As modeled, only salary based fairness influences ability to attract high quality candidates. On the other hand, work quality of national staff can be influenced by both salary, and work value, based, fairness. Fairness of both types drops to 0.3 as salaries for foreigners approach 10 times that of nationals or work value of nationals approaches 10 times that of foreigners. If the salary or work value ratios are 1 then either perception of fairness is also 1.

Herein fairness is related solely to salary ratios and to relative value of work provided, but ultimately there are a number of other issues which might influence the perception of fairness (see Ellsworth 1998 pages 31-33).

This model deals with the question of whether international staff are needed on a project via the perception that they are needed. This is perception is determined, in the real world, by the work quality of national staff. The model determines this perception using the ratio of international to national work quality as input to a simple look-up function. I have assumed here that, because of their nature, international projects have some underlying requirement for international staff regardless of work quality differences. Even if work quality of international and national scientists is the same, the perception of the need for international staff is lowered by only 50, not 100 percent, but may continue to drop over time. The remainder of the international staffing loop is fairly obvious and is not detailed here.

Some Example Outcomes

The effect of salary scales

In the following brief examples I have assumed that international salaries are about 20 times local salaries for equally well qualified personnel. That would not be unusual. What would be a $6000 per month job for a "westerner" might be $300 for a local consultant. Here I have started with a salary of 100 for local, and 2000 for international, staff. The work quality of typical local consultants is 40 but 10% of the workforce are well qualified and have a basic work quality of 100. Values of other key components are given in Table 1.

If normal salary levels are initially offered work quality is initially limited by lower staff qualifications, by proportion of time available for project work, and by perception of fairness. Thus, even though average workers can do work of quality 40 this is degraded by the fact that they can only, in reality, work part time, and are bothered by the inequities in the national:international labor system. Work quality of hired national staff gradually rises as salaries improve and new staff are hired (Figure 3).

With salary scales tripled the situation is only marginally better (Figure 4). Although the proportion of well qualified staff starts at a point three times that in the labor pool, initial quality of work is still degraded by a low perception of fairness and to some extent by time constraints caused by inadequate income. The initial potential work quality of hired

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[6] Value of work here is defined simply as quality of work provided divided by salary.

personnel is 60, but degrading factors lower it to 40. As above salaries gradually rise as employers attempt to improve staff qualifications and work quality.

An initial salary scale 5 times the base national salary is sufficient to hire only well qualified workers, so that the potential work quality of employees is 100. But even at this salary level there is an effect of perception of fairness which lowers actual work quality somewhat. This causes a small long term decline in salaries. Nevertheless, at this salary level the relationship of salaries to prevailing local salaries is dominant, and work quality is not overpowered by effects of unfairness. National salaries are roughly 40% of international salaries which drop some what as the perceived need for international consultants drops from 1.0 to 0.5. As the need for these consultants declines so do international salaries helping to improve the perception of fairness. Although work quality of international consultants drops slightly (due to lower salaries) work value of international consultants actually increase somewhat. Although work quality of nationals rises, their rising salaries cause their work value to drop. Nevertheless, even after it drops, work value of nationals is still more than 3 times that of international consultants.

Effect of Qualifications of Workers in the Labor Pool

We might expect that a labor pool with many well qualified workers would raise work quality. However, at low to moderate initial salaries an increasing proportion of well qualified workers in the labor pool can have a depressing effect on salaries and on consequently on work quality, particularly if worker qualification is a large influence for setting salaries. If employers set salaries only high enough to attract the best employees, these salaries will be lower if there are many good potential employees available. At such salaries the effects of unfairness and limited work time will adversely influence work quality (Figure 5) and, depending on the weightings used, this may feed back to further lower salaries (Figure 6). If initial salaries are high enough to prevent an excessive decreased perception of fairness, then higher proportions of well qualified workers in the labor pool will increase work quality as expected.

The Effect of Fairness on Work Quality

In the model perception of fairness is used in two ways: to determine success in hiring well qualified staff and to determine work quality. The national:international salary ratio effect on fairness is used in calculating the effect on hiring qualified staff, although this, to a large extent, is overpowered by the effect of the ratio of the project salary scales compared to typical local salaries (i.e. the *relative salary for nationals*).

I have also included a concept of fairness based on work value. National staff may realize that value of their work in comparison to the value of work carried out by international consultants is what is important, rather than absolute salary scale differences. For example, they may realize that a project cannot pay a higher salary if workers can not show up for work regularly, regardless of the reason. As work quality of nationals approaches that of international staff this second measure of fairness, the work value ratio, will approach the salary ratio. If work quality is the same and a salary differential remains, the relative value of national staff work will be higher than that of international staff. This maintains a feeling of unfairness even if project salaries are significantly higher than typical national salaries.

The perception of fairness which influences work quality includes this second measure. In the model, fairness as it influences work quality can be affected by both national:international salary ratio and national:international work value ratio. The relative weighting of these two influences on perception of fairness can significantly changes the work quality of national staff especially at intermediate salary levels (Figure 7).

A lot depends on the perception of fairness, and the model lookups which determine it. As presented here, fairness based on salary approaches 1.0 when local and international salaries are equal. Salary based fairness drops to a minimum of 0.3 when international to national salaries are in a ratio of 10:1 or above.

If fairness is influenced primarily by the ratio of relative work value, then national workers are more willing to work at reduced wages understanding that such wages are lower because they are unable to work full time, for example. But as work quality approaches that of international staff the feeling of unfairness will increase unless national wages also rise.

DISCUSSION

These preliminary ideas about the dual salary scale question and its effect on the work situation within international projects brings up a number of interesting questions.

We may wish to consider, for example, how employees' concept of fair treatment is influenced by the fairness of other employers competing for high quality staff. Herein this issue is modeled as a constant, but in reality might involve feedbacks influencing salaries and fairness due to competition for good staff. This in turn may affect inter-project collegiality if excessive "stealing" of good staff occurs.[7] Another issue not addressed here is the difficulty which might be faced by highly paid national staff when attempting to work cooperatively with national staff paid normal salaries at governmental or other cooperating agencies. The concept of inter-institutional inequity can influence inter-institutional cooperation.

Detail as to the effects on workplace collegiality and related interactions might also be investigated. Are underpaid national staff less or more likely to be fired if work quality is not good? What effect might this have on their work quality? Might promising junior level staff be promoted too quickly by well meaning international colleagues attempting to help them obtain a higher salary? How would this affect the perception of their work quality, and work value?

It is possible also that different levels of staff might perceive fairness differently. Senior level national staff might be less willing to put up with perceived inequity than entry level staff, who may be happy to have a job.[8] Would such a situation imply that a graded salary system is appropriate: one where large national : international differentials exist for low level jobs and smaller differences at more senor levels?

These very preliminary findings, based on reasonable assumptions incorporated into look-up functions, indicate the importance of relative salary (salary compared to the prevailing national rate) rather than salary differential (compared to foreign salaries) in the hiring of, and quality of work by, local consultants. This is consistent with the know ability of projects and organizations to hire good people away from local employers, without paying international salaries. Questions remain however as to the work environment and collegial atmosphere within dual salary scale projects. If fairness can be reinforced with other non-salary benefits,

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[7] Often projects funded by international donors use some agreed upon quasi-standard for fixing a general ceiling on national staff salaries, or survey each other to determine typical project salaries.

[8] In one interesting case a very well qualified senior national consultant refused to work at all, but nevertheless received his, very low, national salary.

then a collegial atmosphere may prevail in spite of large salary differentials, particularly if workers views of fairness are based on work value, and if good work quality can significantly improve salaries. Employers need to be aware of equity issues if maximum possible work quality is to be expected from national staff.

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Table 1. Values used for key model components unless otherwise stated.

Component Name	base value used		interpretation
weighting for determining salary scale	qualifications	work quality	Salary scales are based 50% solely on getting well qualified applicants and 50% on work quality of existing employees
	0.50	0.50	
fair treatment type weighting	salary ratio	value of work	Employees' perception of fair treatment is based 50% on the international : national salary ratio and 50% on the international : national relative work value.
	0.50	0.50	
starting salary multiplier	varies from 1 to 5		Initial salary offered compared to normal local salary for nationals.
Proportion of well qualified personnel in local labor pool			0.1
Work quality of average workers in labor pool			40
typical perception of fairness of other employers (by potential employees)			0.25
proportion of well qualified staff in international labor pool			0.80
Normal salary for nationals			$100
Initial international salary			$2000

Work Quality, Salaries & Proportion of Well Qualified National Staff

Quality of Work Provided by National Consultants : xx ——1——1——1—— work quality
Proportion of National Staff Who are Well Qualified : xx ——2——2——2——2——2— dmnl
Project Salaries for National Staff : xx ——3——3——3——3——3——3——3——3——3—— $
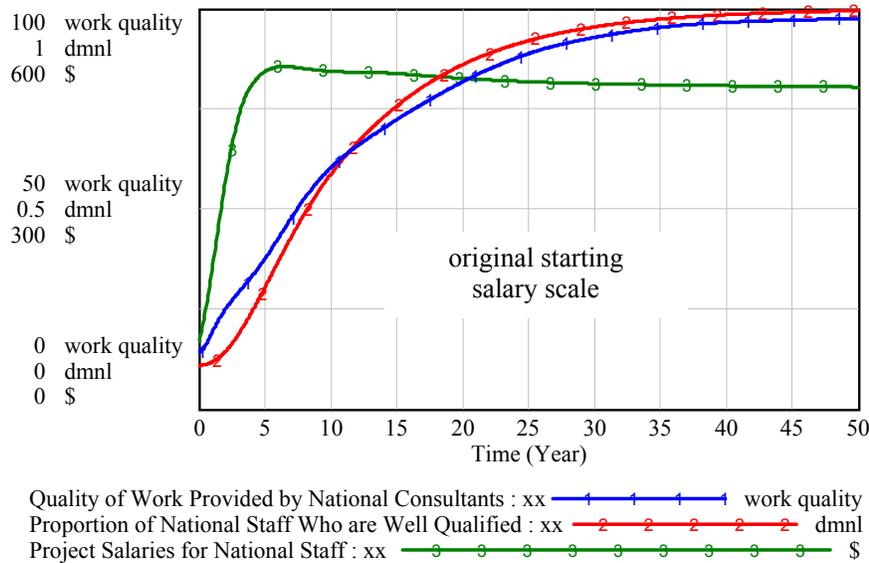
Figure 3. Initially national staff are offered normal national salaries. Few well qualified staff can be hired and the initial work quality of hired staff is also degraded both by the fact that they must spend time at other work (because of their low salary) and the effects of perceived unfairness caused by comparison with their international colleagues. While projects rapidly adjust salaries the slowness of staff turnover limits hiring of new staff.

Work Quality, Salaries & Proportion of Well Qualified National Staff

Quality of Work Provided by National Consultants : xx ——1——1——1——1—— work quality
Proportion of National Staff Who are Well Qualified : xx ——2——2——2——2——2—— dmnl
Project Salaries for National Staff : xx ——3——3——3——3——3——3——3——3——3—— $

Figure 4. If salaries are tripled, a larger proportion of well qualified staff can be hired but this is still only 33% of national staff. Salaries rapidly rise so that well qualified staff can be hired, but this is limited by staff turnover rates.

Effect of Proportion of Well Qualified Workers in Labor Pool on Work Quality

Figure 5 A higher proportion of qualified staff in the labor pool tends to lower salaries needed to attract well qualified staff. Lower salaries will increases perception of unfairness and will significantly lower work quality.   Lowered work quality may subsequently limit salaries. In this example, starting salary is three times the normal salary for nationals.

National Staff Salary Trajectories for Different Fractions of Well Qualified Staff in the Labor Pool
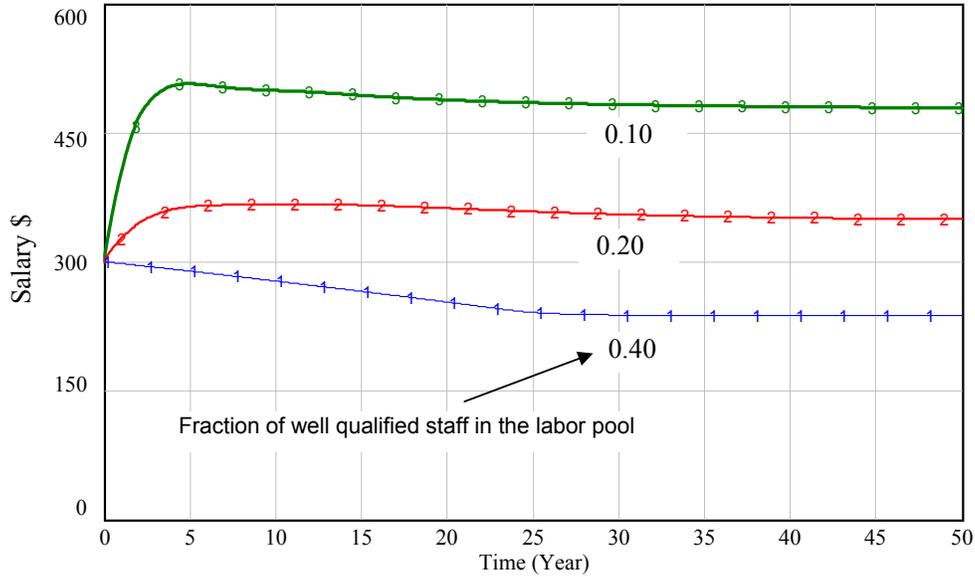
Figure 6. Increases in well qualified staff in the labor pool will tend to lower salaries. This effect will be more severe if hiring practices merely focus on ensuring that hired staff have excellent qualifications and ignore issues of fairness that might emerge to hinder work quality. In this example starting salary is three times the normal salary for nationals.

Effect of Mode of Perception of Fairness on Quality of Work Provided by National Consultants
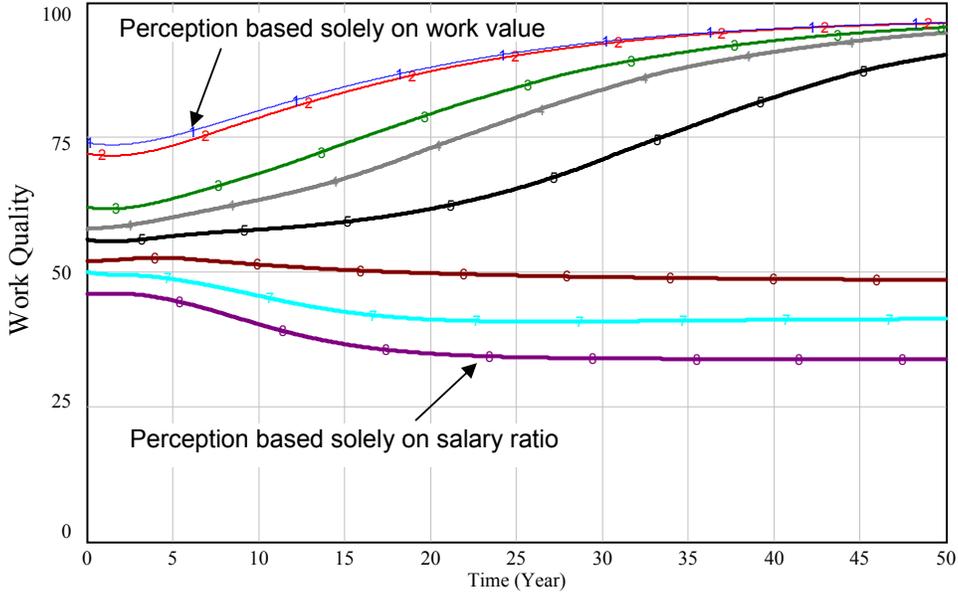
Figure 7. Two factors affect perception of fairness: international:national salary ratio and international:national work value ratio. If workers base this perception primarily on salary ratio then there is a stronger adverse effect on work quality (lower line). Starting at the top the fraction of effect caused by work value ratio is 1, 0.9, 0.5, 0.4, 0.3, 0.2, 0.1, and 0.0. Starting salary was 4 times the normal national salary and employers based their hiring 10% on worker qualifications and 90% on observed work quality of existing workers.

Model Equations

(01)   average international staff turnover time = 2
        Units: Year

                Average time an international consultant remains on a
                project.

(02)   BASELINE PERCEPTION = 1
        Units: dmnl

                The underlying perception that foreign staff are needed on
                a project. Herein the project is assumed to be an
                -international- one by definition having some international
                staff.

(03)   changing international consultant work quality = (indicated int work quality
   - Quality of Work Provided by International Consultants) / time needed for int work quality to change

        Units: work quality/Year
                Changes in the actual quality of work provided by
                international consultants.

(04)   changing international salary scale = international salary difference
   / TIME NEEDED FOR INT SALARY SCALES TO CHANGE
        Units: $/Year
                change in international salaries

(05)   changing perception of need for international consultants = (new perception that int staff needed
   - Perception that International Staff are Needed) / TIME NEEDED FOR PERCEPTION OF NEED TO
CHANGE

        Units: dmnl/Year
                The change in the perception that international consultants
                are needed to accomplish the goals of the project.

(06)   changing proportion of well qualified int staff = quality difference
   / average international staff turnover time
        Units: dmnl/Year
                changes in the proportion of well qualified staff

(07)   changing proportion of well qualified staff = difference in staff quality
   / TIME NEEDED FOR STAFF TURNOVER
        Units: dmnl/Year
                The gradual change in staff quality .

(08)   changing salary scales = (salary difference / TIME NEEDED FOR SALARY SCALES TO CHANGE
)
        Units: $/Year
                Gradual change occurring to the salary scales over time.

(09)   changing work quality = difference between new and existing work quality
   / TIME NEEDED FOR WORK QUALITY TO CHANGE
        Units: work quality/Year
                The change occurring in work quality do to quality of staff
                hired and other practices.

(10)   difference between new and existing work quality = new realized quality of work
     - Quality of Work Provided by National Consultants
          Units: work quality
                         The difference between the existing work quality and the
                         new expected work quality.

(11)   difference in staff quality = potential proportion of well qualified new staff
     - Proportion of National Staff Who are Well Qualified
          Units: dmnl
                         The difference between new possible well qualified employee
                         proportion and the current proportion.

(12)   effect fair treatment ratio on recruitment of nationals LK ([(0,0)-(5,5)
     ],(0,0.5),(1,1),(2.47059,1.56584),(3.69412,1.88612),(5,2.2)
)
          Units: dmnl
                         A graphic relationship describing how a perception of fair
                         treatment by an organization might affect the pool of
                         qualified applicants. \!perception of fair treatment
                         ratio\!effect on recruitment of qualified personnel

(13)   effect of fair treatment on work quality LK ([(0,0)-(1,1)],(0,0.2)
     ,(0.223529,0.270463),(0.385882,0.395018),(0.515294,0.569395)
     ,(0.618824,0.779359),(0.682353,0.864769),(0.743529,0.928826)
     ,(0.828235,0.975089),(1,1))
          Units: dmnl
                         A graphical relationship describing the effect that
                         perception of fair treatment due to salary has on work
                         quality. \!perception of fair treatment\!effect on work
                         quality dmnl

(14)   effect of other factors = 1
          Units: dmnl
                         Link point in model for effects of other factors on the
                         quality of work provided by international consultants.
                         Implication that salary is not the only factor. Currently
                         this variable is not used.

(15)   effect of perception of fair treatment on recruitment of nationals
                    = effect fair treatment ratio on recruitment of nationals LK (Perception of Fair Treatment
Based on Salaries
          / typical perception of fairness)
          Units: dmnl
                         The effect that the perception of fairness has on the
                         ability of the project to attract and employ well qualified
                         employees.

(16)   effect of perception of need for int staff on int salary scale (
     [(0,0)-(6,3)],(0,0.5),(1,1),(1.63765,1.32384),(2.17412,1.54804)
     ,(2.56941,1.6548),(3.00706,1.74021),(4.16471,1.88968),(5.61882,2)
)
          Units: dmnl
                         If the perception that international staff are needed
                         increases, then efforts to attract international staff will
                         cause an increase in international salary scales.
                         \!perception that international staff are needed\!effect on

salary scale dmnl

(17)   effect of relative salary on potential proportion of well qualified nationals in positions
                ([(0,0)-(10,10)],(0,0.5),(1,1),(1.90588,1.70819),(3.01176,2.95374)
        ,(4.35294,5.08897),(5.24706,6.72598),(6.42353,7.93594),(8.14118,9.32384),(10,10))
        Units: dmnl
                        A graphic relationship describing how relative salary
                        might effect the pool of potential well qualified
                        candidates for national positions. \!relative salary for
                        nationals\!effect on proportion in hired staff

(18)   "effect of relative salary on success of recruitment & retention of international staff"
                ([(0,0)-(4,2)],(0,0),(0.254118,0.476868),(0.451765,0.718861),(0.743529,0.939502)
        ,(1,1),(1.99529,1.11744),(3,1.2))
        Units: dmnl
                        A graphical relationship showing the effect of the salary
                        scale ratio on success of recruitment of well qualified
                        international staff \!relative salary for international
                        staff\!effect on proportion of well qualified ints being
                        hired

(19)   effect of relative salary on time spent on project ([(0,0)-(4,1)
        ],(0,0.1),(0.555294,0.213523),(0.790588,0.295374),(1,0.4),
        (1.26118,0.544484),(1.55294,0.704626),(1.81647,0.782918),(2.07059,0.839858)
        ,(2.57882,0.932384),(3.07765,0.975089),(4,1))
        Units: dmnl
                        A graphical relationship of the effect that salary level
                        (salary ratio) will have on the amount of time available
                        for project work. \!salary ratio\!Portion of time
                        available for project work Dmnl

(20)   effect of salary level on recruitment of nationals = effect of relative salary on potential proportion of
well qualified nationals in positions(relative salary for nationals)
        Units: dmnl
                        Effect that salary has on the recruitment of well qualified
                        nationals from the national labor pool.

(21)   effect of salary on staff turnover time ([(0,0)-(10,10)],(0,0),(1,1)
        ,(2.75294,2.02847),(5,3),(7.38824,3.66548),(10,4))
        Units: dmnl
                        A graphic relationship describing how current salary levels
                        effect the average length of time national staff remain on
                        the project. \!salary ratio \!effect on staff turnover
                        time Dmnl

(22)   effect of salary ratio on perception of fair treatment ([(1,0)-(10,1)
        ],(1,1),(2.16471,0.939502),(3.15294,0.854093),(3.81176,0.758007)
        ,(4.32941,0.661922),(5.06588,0.508897),(5.84941,0.395018),
        (6.42118,0.355872),(7.10588,0.327402),(8.09412,0.30605),(10,0.3)
)
        Units: dmnl
                        A graphical function describing the effect that salary
                        ratio has on the perception of fair treatment. \!Foreign to
                        national salary ratio\!Effect on perception of fair
                        treatment Dmnl

(23)   effect of time available for project work on work quality = effect of time available on work quality LK
(proportion of time available for project work)
            Units: dmnl
                                    The effect that time available for project work will have
                                    on work quality. If full time is available for the project
                                    then the work quality will be based on the abilities of the
                                    worker. otherwise the work quality will be lessened by the
                                    fact that the workers are effectively part time.

(24)   effect of time available on work quality LK ([(0,0)-(1,1)],(0.0988235,0)
,(0.164706,0.145907),(0.232941,0.27758),(0.301176,0.377224)
,(0.378824,0.501779),(0.468235,0.619217),(0.569412,0.718861)
,(0.658824,0.811388),(0.745882,0.879004),(0.837647,0.932384)
,(0.910588,0.967972),(1,1))
            Units: dmnl
                                    A graphical relationship describing the effect that the
                                    proportion of time available for project work has on work
                                    quality. \!proportion of time available for project
                                    work\!effect on work quality Dmnl

(25)   effect of well qualified proportion on salary scale multiplier (
[(0,0)-(1,10)],(0,10),(0.12,7.65125),(0.235294,5.80071),(0.36,4.23488)
,(0.5,3),(0.743529,1.6726),(1,1))
            Units: dmnl
                                    The effect that current proportion of well qualified staff
                                    has on offered salaries. As proportion of well qualified
                                    staff approaches 1 the salaries should stabilize.
                                    \!Proportion of staff well qualified\!effect on salary
                                    scales

(26)   effect of work quality on salary scale ([(0,0)-(1,1)],(0,0.7),(0.136471,0.772242)
,(0.244706,0.825623),(0.367059,0.875445),(0.501176,0.914591)
,(0.741176,0.97153),(1,1))
            Units: dmnl
                                    A graphical relationship describing the effect that work
                                    quality has on the salary scale.   \!work quality
                                    ratio\!effect on salary scale

(27)   effect of work quality ration on new perception ([(0,0)-(2,2)],(0.0282353,0)
,(0.192941,0.0284698),(0.5,0.1),(0.621176,0.163701),(0.757647,0.27758)
,(1,0.5),(2,1.5))
            Units: dmnl
                                    \!international to national work quality ratio\!effect on
                                    perception that foreigners are needed dmnl

(28)   effect of work value on fairness LK ([(0,0)-(10,1)],(1,1),(2.16471,0.939502)
,(3.15294,0.854093),(3.81176,0.758007),(4.32941,0.661922),
(5.06588,0.508897),(5.84941,0.395018),(6.42118,0.355872),(7.10588,0.327402)
,(8.09412,0.30605),(10,0.3))
            Units: dmnl
                                    A graphical description of the effect that the work value
                                    ratio has on the perception of fair treatment. \!relative
                                    value of national staff work\!effect on perception of
                                    fairness

(29)   effect that perception of fair treatment has on work quality = (

1 - fair treatment type weighting) * effect of fair treatment on work quality LK
(Perception of Fair Treatment Based on Salaries) + fair treatment type weighting
* effect of fair treatment on work quality LK (Perception of Fair Treatment Based on Work Value
)
    Units: dmnl

> Effect that the perception of fair treatment will have on
> workers' work quality. As modeled here, the typical
> fairness in typical employers is not a factor, only the
> fairness of the current employer.

(30)   EXPECTED BEST WORK QUALITY = 100
    Units: work quality

> The work quality that is expected by good, hard working
> national consultants.

(31)   fair treatment type weighting = 0.5
    Units: dmnl [0,1,0.1]

> proportion of perception of unfairness due to value of work
> rather than to salary differential. (0 to 1)

(32)   FINAL TIME = 50
    Units: Year

> The final time for the simulation.

(33)   "foreign / local salary ratio" = Project Salaries for International Staff
/ (Project Salaries for National Staff * RELATIVE INTERNATIONAL VALUE OF LOCAL CURRENCY
)
    Units: dmnl

> The ratio of the current international to the current
> national salary

(34)   indicated int work quality = work quality of hired international consultants
* effect of other factors
    Units: work quality

> Work quality expected with the new current proportion of
> well qualified consultants.

(35)   indicated proportion of well qualified international staff = MIN (
proportion of well qualified staff in international labor pool
* "effect of relative salary on success of recruitment & retention of international staff"
(relative salary for international staff) , 1)
    Units: dmnl

> The proportion of well qualified international staff that
> can be expected to be hired using the current international
> salary scale

(36)   INITIAL INTERNATIONAL SALARY = 2000
    Units: $

(37)   initial quality of work = 50
    Units: work quality [0,100,2]

(38)   INITIAL TIME = 0
    Units: Year

> The initial time for the simulation.

(39)   international salary difference = new expected international salary scale
    - Project Salaries for International Staff
        Units: $
                        Difference between current and new expected international
                        salaries

(40)   international to national work quality ratio = Quality of Work Provided by International Consultants
    / Quality of Work Provided by National Consultants
        Units: dmnl
                        Ratio of international consultant work quality to local
                        consultant work quality.

(41)   new expected international salary scale = NORMAL INTERNATIONAL SALARY
    * effect of perception of need for int staff on int salary scale
      (Perception that International Staff are Needed)
        Units: $
                        The work quality we should be able to get if we could hire
                        all new staff right away using the current salary scales.

(42)   new indicated salary scale = new indicated salary scale based on proportion of well qualified staff
avaiable
    * WEIGHTING FOR DETERMINING SALARY SCALE + new indicated salary scale based on work
quality
        * (1 - WEIGHTING FOR DETERMINING SALARY SCALE)
        Units: $
                        weighted new salary scales based on both proportion of
                        qualified personnel already working and on the quality of
                        work being carried out.

(43)   new indicated salary scale based on proportion of well qualified staff avaiable
                        = Project Salaries for National Staff * effect of well qualified proportion on salary scale
multiplier
        (potential proportion of well qualified new staff)
        Units: $
                        New salary scale based on the proportion of well qualified
                        staff currently available for hire at given salary scales.
                        This is t an indicator of salaries which would have to be
                        paid to attract good workers. If potential proportion is
                        already 1 then salary scales are view as adequate by this
                        measure.

(44)   new indicated salary scale based on work quality = Project Salaries for National Staff
    * effect of work quality on salary scale (work quality ratio)
        Units: $
                        A proposed new salary scale as modified by work quality of
                        consultants currently on the job.

(45)   new perception that int staff needed = BASELINE PERCEPTION * effect of work quality ration on
new perception
        (international to national work quality ratio)
        Units: dmnl
                        The immediate perception that international staff are
                        needed, now accounting for the fact that this perception
                        needs time to develop.

(46)   new realized quality of work = potential work quality of hired national staff

* effect of time available for project work on work quality * effect that perception of fair treatment has on work quality

        Units: work quality
                The quality of work that new workers can contribute given
                both their innate work abilities as well as the amount of
                time they will have for project activities.

(47)   NORMAL INTERNATIONAL SALARY = 2000
        Units: $
                Salary that international consultants have come to expect
                on similar projects. The going rate.

(48)   NORMAL SALARY FOR NATIONALS = 100
        Units: $ [0,1000,50]
                Typical salary for local consultants in similar jobs.

(49)   NORMAL TIME NEEDED FOR STAFF TURNOVER = 3
        Units: Year
                The typical amount of time staff remain with the project at
                prevailing local salary levels.

(50)   perceived fraction of international staff needed = Perception that International Staff are Needed
    * typical fraction of international staff
        Units: dmnl
                The revised idea as to how many international staff are
                needed to do the project.

(51)   Perception of Fair Treatment Based on Salaries = SMOOTHI (effect of salary ratio on perception of fair treatment
      ("foreign / local salary ratio") , time needed for perception to change
     , effect of salary ratio on perception of fair treatment (
       "foreign / local salary ratio"))
        Units: dmnl
                This is the perception that workers have of there
                treatment, based on the relative salary level. Other
                factors could also affect this perception. This perception
                takes some time to develop as salary scales change, so it
                is calculated as a delay.

(52)   Perception of Fair Treatment Based on Work Value = SMOOTHI (effect of work value on fairness LK
     (relative value of national staff work) , time needed for perception to change
     , effect of work value on fairness LK (relative value of national staff work
))
        Units: dmnl
                The current perception of fair treatment by national staff
                if only the comparative value of work of national and
                international staff is considered.

(53)   Perception that International Staff are Needed = INTEG(changing perception of need for international consultants
     , BASELINE PERCEPTION)
        Units: dmnl
                The current perception that international staff are needed
                to achieve project goals.

(54)   potential proportion of well qualified new staff = MIN (PROPORTION OF WELL QUALIFIED
PERSONNEL IN LOCAL LABOR POOL
          * effect of perception of fair treatment on recruitment of nationals
            * effect of salary level on recruitment of nationals ,
        1)
          Units: dmnl
                          The proportion of well qualified staff who could be hired
                          under current circumstances. Cannot be greater than 1.0.

(55)   potential work quality of hired national staff = (EXPECTED BEST WORK QUALITY
    - WORK QUALITY OF AVERAGE WORKERS IN LABOR POOL) * Proportion of National Staff Who
are Well Qualified
          + WORK QUALITY OF AVERAGE WORKERS IN LABOR POOL
          Units: work quality
                          The quality of work expected given current staff quality
                          and work habits as affected by perception of fair
                          treatment. This is a straight line relationship where x is
                          proportion of national staff who are well qualified.

(56)   Project Salaries for International Staff = INTEG(changing international salary scale
        , INITIAL INTERNATIONAL SALARY)
          Units: $
                          Typical current project salaries for internationally
                          recruited project staff

(57)   Project Salaries for National Staff = INTEG(changing salary scales
        , STARTING SALARY MULTIPLIER * NORMAL SALARY FOR NATIONALS)
          Units: $
                          The current salary levels for local consultants.

(58)   Proportion of International Staff Who are Well Qualified = INTEG(
      changing proportion of well qualified int staff , indicated proportion of well qualified international staff)
          Units: dmnl
                          The current proportion of international staff who are
                          considered well qualified.

(59)   Proportion of National Staff Who are Well Qualified = INTEG(changing proportion of well qualified
          staff , potential proportion of well qualified new staff)
          Units: dmnl
                          The proportion of staff who are well qualified.

(60)   proportion of time available for project work = effect of relative salary on time spent on project
        (relative salary for nationals)
          Units: dmnl
                          The proportion of time that is actually available for
                          project work, given the current salary levels that may
                          require people to look for other work or consultancies.

(61)   PROPORTION OF WELL QUALIFIED PERSONNEL IN LOCAL LABOR POOL = 0.1
          Units: dmnl [0.1,0.9,0.1]
                          Fraction of the local labor pool who are considered well
                          qualified. We might further define labor pool as people
                          who apply or might apply for open positions and who could
                          conceivably be hired. Further the labor pool is considered
                          as composed of normal or average workers and "well
                          qualified" workers.

(62)   proportion of well qualified staff in international labor pool =
      0.8
          Units: dmnl [0,1,0.1]
                          Proportion of international consultants who are well
                          qualified

(63)   quality difference = indicated proportion of well qualified international staff
      - Proportion of International Staff Who are Well Qualified
          Units: dmnl
                          Difference between the potential proportion of well
                          qualified staff and the current proportion of well
                          qualified staff.

(64)   Quality of Work Provided by International Consultants = INTEG(changing international consultant
work quality
        , indicated int work quality)
          Units: work quality
                          Actual quality of work provided by international
                          consultants.

(65)   Quality of Work Provided by National Consultants = INTEG(changing work quality
        , initial quality of work)
          Units: work quality
                          Current level of work quality of local consultants on the
                          project.

(66)   RELATIVE INTERNATIONAL VALUE OF LOCAL CURRENCY = 1
          Units: dmnl [0,2,0.1]
                          Relative value of local currency compared to international
                          currency. Local currency is used to pay national staff.
                          International currency is used to pay internationally
                          recruited staff. A value of one means the units used are
                          the same. This variable can be used to simulate a
                          devaluation of local currency for example.

(67)   relative salary for international staff = Project Salaries for International Staff
        / NORMAL INTERNATIONAL SALARY
          Units: dmnl
                          The ratio of current international salaries to what is
                          considered a normal international salary

(68)   relative salary for nationals = Project Salaries for National Staff
        / NORMAL SALARY FOR NATIONALS
          Units: dmnl
                          The ratio between current project salary ratios and the
                          typical values for similar jobs in the national economy.

(69)   relative value of national staff work = value of national staff work
        / value of international staff work
          Units: dmnl
                          The relative value of work of national staff compared to
                          international staff

(70)   salary difference = (new indicated salary scale - Project Salaries for National Staff
)

Units: $

        Difference between the new salaries and the old salaries.

(71)   SAVEPER = TIME STEP
        Units: Year

        The frequency with which output is stored.

(72)   STARTING SALARY MULTIPLIER = 1
        Units: dmnl [1,6,0.25]

        The maximum local salary level allowed in terms of
        multipliers of the standard local salary level.

(73)   TIME NEEDED FOR INT SALARY SCALES TO CHANGE = 3
        Units: Year

        Mean time for salary scales to be changed

(74)   time needed for int work quality to change = 1
        Units: Year

        The time needed for changes in well qualified nationals to
        actually have an impact on overall work quality.

(75)   TIME NEEDED FOR PERCEPTION OF NEED TO CHANGE = 5
        Units: Year

        Time needed for the changed perception of the need for
        international consultants to become a general perception.

(76)   time needed for perception to change = 3
        Units: Year

        Typical time needed for a change in perception to take place

(77)   TIME NEEDED FOR SALARY SCALES TO CHANGE = 4
        Units: Year

        The time needed for proposed salary changes to be
        implemented.

(78)   TIME NEEDED FOR STAFF TURNOVER = NORMAL TIME NEEDED FOR STAFF TURNOVER
     * effect of salary on staff turnover time (relative salary for nationals
)
        Units: Year [1,15,1]

        Time needed for potential changes in staff quality to be
        realized. Measures how long existing staff remain in place
        on the average. Higher salary levels make this longer.

(79)   TIME NEEDED FOR WORK QUALITY TO CHANGE = 1.5
        Units: Year

        The time needed for work quality to absorb changes cause by
        new hiring and other practices.

(80)   TIME STEP = 0.0625
        Units: Year

        The time step for the simulation.

(81)   typical fraction of international staff = typical number of international positions
     / (typical number of international positions + typical number of national positions
)
        Units: dmnl

fraction of initial staff in international positions

(82)   typical number of international positions = 5
         Units: staff [0,20,1]
                        The number of international staff initially planned for the
                        job.

(83)   typical number of national positions = 15
         Units: staff [0,20,1]
                        Initial number of national staff planned for the job

(84)   typical perception of fairness = 0.25
         Units: dmnl [0,1,0.05]
                        Typical fairness of employers as perceived by employees in
                        the labor market.

(85)   value of international staff work = Quality of Work Provided by International Consultants
    / Project Salaries for International Staff
         Units: work quality/$
                        work value for international staff

(86)   value of national staff work = Quality of Work Provided by National Consultants
    / Project Salaries for National Staff
         Units: work quality/$
                        The work value for national staff

(87)   WEIGHTING FOR DETERMINING SALARY SCALE = 0.5
         Units: dmnl [0,1,0.1]
                        Relative importance of worker qualification vs quality of
                        work carried out in setting of new salary scale policy. A
                        value of 1 indicates that salary scales sufficient to
                        attract a staff of 100 percent well qualified regardless of
                        work quality is sufficient, and that work quality is an
                        unrelated factor. Zero implies that work quality of staff
                        alone should determine salary scales. Range should be from
                        0 to 1.

(88)   WORK QUALITY OF AVERAGE int WORKERS = 80
         Units: work quality
                        Work quality of typical international consultants on a
                        scale of 0 to 100

(89)   WORK QUALITY OF AVERAGE WORKERS IN LABOR POOL = 40
         Units: work quality [0,100,10]
                        The work quality of average workers in the labor pool on a
                        scale of 0 to 100. This value excludes the well qualified
                        workers.

(90)   work quality of hired international consultants = (EXPECTED BEST WORK QUALITY
    - WORK QUALITY OF AVERAGE int WORKERS) * Proportion of International Staff Who are Well
Qualified
        + WORK QUALITY OF AVERAGE int WORKERS
         Units: work quality
                        Typical work quality of randomly selected international
                        consultant in labor pool

(91)   work quality of typical national consultants = (EXPECTED BEST WORK QUALITY
    - WORK QUALITY OF AVERAGE WORKERS IN LABOR POOL) * PROPORTION OF WELL
QUALIFIED PERSONNEL IN LOCAL LABOR POOL
        + WORK QUALITY OF AVERAGE WORKERS IN LABOR POOL
        Units: work quality [0,100,10]
                            This is the typical work quality of average local
                            consultants compared to the best available which would be
                            100. This might be considered the work quality of workers
                            selected at random including both average and well
                            qualified workers. This measure does not take into account
                            the problem of working part-time. This value reflects only
                            the absolute quality of work they will do while on the job.

(92)   work quality ratio = Quality of Work Provided by National Consultants
    / EXPECTED BEST WORK QUALITY
        Units: dmnl
                            The ratio between the current work quality and the typical
                            work quality of local consultants. (Not accounting for the
                            fact that sometime local consultants cannot work full time.)