WORKING PAPER No. 27

PN-ABD-988

THE CHANGING SHAPE OF THE JOB PYRAMID: AN ANALYTICAL NOTE

Byron MOOK

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International Service for National Agricultural Research

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ISNAR WORKING PAPERS

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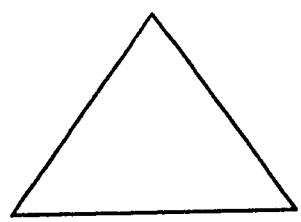
THE CHANGING SHAPE OF THE JOB PYRAMID: AN ANALYTICAL NOTE

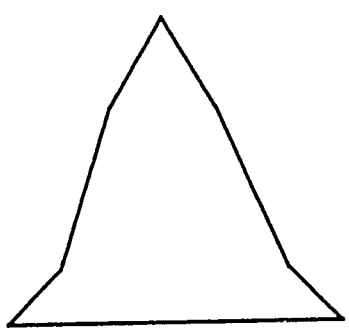
I. THE MANAGEMENT ISSUE

The focus of this analytical note is on career planning for scientists. The objective is to present one way in which a research manager can estimate what the human resources in his/her organization will look like in 5-10 years.

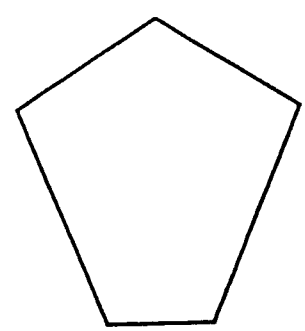
In the 1960s and 1970s, many national agricultural research systems (NARS) were able to recruit rather large numbers of scientific personnel. Agricultural research was a high-visibility field then and government budgets were often less constrained than they are today. The job pyramid in research organizations in those years usually looked something like this...



Over the past ten years, however, the pressure on national budgets has increased. A NARS is now just one out of more and more claimants on public funds. Lower levels of recruitment are the norm. Those scientists who were recruited earlier have had to be promoted. The result is a pyramid which often looks something like this...



or even



A research manager looking ahead at the profile of human resources in his/her organization must ask: what will be the shape of the job pyramid in 5-10 years? What may be the management implications of such a changing shape? Is there a danger of the organization becoming top heavy, with too many leaders and not enough followers?

II. DETERMINANTS OF THE PYRAMID

For the research manager, the starting point in the analysis of the job pyramid is a look at two considerations.

(1) The movement of professional staff between salary grades. How many grades (or steps within grade) does the NARS have? How often does an individual scientist move between steps/grades? If practice over the past 5-10 years is a guide, what generalizations can the manager make about probable movements over the next 5-10 years?

(2) The net annual increase in professional staff. How many new staff will the government allow the NARS to add each year? Is there a fixed annual rate of increase? If so, does such a figure include both leavings (retirements and resignations) and joinings (recruitment)?

This note deals with these two considerations by presenting illustrative case-study data from one NARS. Let us begin with the first consideration by looking at the staff structure in this case study.

III. MOVEMENT OF STAFF BETWEEN GRADES (PROMOTIONS)

Analysis of staff promotions requires two types of data.

(1) A list of the distribution of scientific staff in each grade. In the case study NARS, the distribution of the 1450 scientists from Grade 3 (the usual entry point for a B.Sc.) to Grade 10 (the Director General) in 1984 was as follows. More detail is presented in Tables 1-2.

	Number	Percent
Grade 3	99	7
Grade 4	353	24
Grade 5	400	28
Grade 6	402	28
Grade 7	171	12
Grade 8	20	1
Grade 9	4	-
Grade 10	1	-

(2) The precise grade and salary list. The most important feature of such data is the number of people in each grade above what might be called "the crossover point". This point is the one at which a person's current salary level is equal to the lowest salary level in the next grade.

In the case study NARS, the following percentages of scientists were above "the crossover point".

Grade 3	5
Grade 4	8
Grade 5	2
Grade 6	24
Grade 7	90

Such figures were very low, particularly in Grades 3-5. Almost every scientist seemed to be "promoted" when he/she reached the crossover point. Even more dramatic was the number of people at "the crossover point" + 1 (i.e., one more salary level).

Grade 3	1
Grade 4	2
Grade 5	1
Grade 6	13
Grade 7	84

The conclusion a manager would have had to draw from such figures was that career progression (promotion) in this organization was almost "automatic". As the data show, almost no one failed to move to the next grade when he/she had reached the crossover point.

Such a finding clearly has significance for the future shape of the job pyramid. As can be counted from Table 2, there were 33 salary steps in this organization from the bottom of Grade 3 to the top of Grade 8. If the pattern of "automatic promotion" was carried to its logical conclusion - assuming progression at the rate of one step per year - a scientist could join the organization at age 27 in Grade 3 and retire at age 60 at the top of Grade 8, never having gotten a double increment (i.e., a recognition of special performance or merit).

IV. CALCULATIONS TO DETERMINE THE FUTURE SHAPE OF THE JOB PYRAMID

With such staff promotion data in hand, the manager then needs to know what net annual increase in personnel will be allowed.

For illustrative purposes, let us use the case-study NARS data and assume three different growth rates: (a) a 4% annual increase in professional staff, (b) a 2% annual increase, and (c) a 0% annual increase. In reality, the government in this NARS had ruled in 1984 that the net annual increase over the next five years was not to exceed 2%.

The manager doing the analysis then combines the 4%, 2%, and 0% values with the "automatic promotion" pattern described above. Here is where the payoff comes. The objective of the analysis is to make a five-year projection from 1984 to determine the shape of the job pyramid in 1989.

In the development of three scenarios (based on the 4%, 2%. and 0% figures), the following assumptions were made. Each of these assumptions can be understood with reference to data from the case-study NARS presented in Table 2.

		Number
(a)	All Grade 8s, 9s, and 10s to retire.	25
(b)	All Grade 7s at 11975 and up to retire.	73
(c)	All Grade 7s at 10365-11415 to become Grade 9s.	70
(d)	All Remaining Grade 7s to become Grade 8s.	28
(e)	All Grade 6s at 9875 and up to become Grade 8s.	30
(f)	All Remaining Grade 6s to become Grade 7s.	372

(g)	All Grade 5s at 6935 and up to become Grade 7s.		54
(h)	All Grade 5s at 5745-6585 to become Grade 6s.		232
(i)	All Grade 5s at 4945-5465 to remain Grade 5s.		114
(j)	All Grade 4s to become Grade 5s.		353
(k)	All Grade 3s to become Grade 4s.	99	
			1450

(1) Scenario 1. 4% Annual Increase in Professional Staff.

(a)	Retirements by 1989 Calculated on Basis of Current Ages	98
(b)	Net Additions by 1989 1450 Base - 4% Growth Per Year	314
(c)	New Recruits by 1989 314 + 98	412
(d)	Apportionment of these New Recruits Between Entry at and Progression to - in 1989:	
	Grade 3 (B.Sc.s)	138
	Grade 4 (M.Sc.s)	137
	Grade 5 (Ph.D.s)	137
		412

(2) Scenario 2. 2% Annual Increase in Professional Staff.

(a)	Retirements by 1989 Calculated on Basis of Current Ages	98
(b)	Net Additions by 1989 1450 Base - 2% Growth Per Year	151
(c)	New Recruits by 1989 151 + 98	249
(d)	Apportionment of these New Recruits Between Entry at and Progression to - 1989:	
	Grade 3 (B.Sc.s)	83
	Grade 4 (M.Sc.s)	83
	Grade 5 (Ph.D.s)	83
		249

(3) Scenario 3. 0% Annual Increase in Professional Staff.

(a)	Retirements by 1989 Calculated on Basis of Current Ages	98
(b)	Net Additions by 1989 1450 Base - 0% Growth Per Year	0
(c)	New Recruits by 1989 0 + 98	98
(d)	Apportionment of these New Recruits Between Entry at and Progression to - 1989:	
	Grade 3 (B.Sc.s)	33
	Grade 4 (M.Sc.s)	33
	Grade 5 (Ph.D.s)	32
		98

V. THE FUTURE SHAPE OF THE JOB PYRAMID

Analysis of the three scenarios yields three different job pyramids by 1989. The differences are as follows...

Scenario 1. 1764 staff in 1989, of whom 31% will be in Grades 7-10. An additional 5% will be in Grade 6 at a salary point equal to the lowest salary point in Grade 7.

Scenario 2. 1601 staff, of whom 35% will be in Grades 7-10. An additional 6% will be in Grade 6 at a salary point equal to the lowest salary point in Grade 7.

Scenario 3. 1450 staff, of whom 38% will be in Grades 7-10. An additional 6% will be in Grade 6 at a salary point equal to the lowest salary point in Grade 7.

Put another way - the important point - by 1989, between 36% and 44% of graduate staff will be at or above a salary level which the organization now associates with upper-level management (Grade 7). These figures compare with those of 28% (14%,14%) in 1984.

VI. CONCLUSION

An exercise of this kind can be most useful, indeed essential, for the research manager. The job pyramid in the case-study NARS is probably not that different from the actual situation in many other NARS.

The major lesson to be learned concerns the importance of career planning. In the case-study NARS, the job pyramid is becoming inverted at a rapid rate. The proportion of scientists at the senior management level is increasing and can be expected to be almost 50% by 1995.

What is a NARS manager able to do in such a situation? What does career planning to deal with a changing job pyramid actually consist of? At least the following four lines of action are possible.

(1) Determination of the ideal shape of the job pyramid. What percentage of total graduate staff should be at each grade?

(2) Development of job descriptions which clearly differentiate between positions (and grades) on the basis of responsibility and required competence. Without such descriptions, the movement of staff between positions/grades cannot be regulated.

(3) Specification of criteria for movement between positions/grades. Such criteria must be related to the above-mentioned job descriptions. Without these criteria, the danger exists that staff will see promotions as unpredictable and beyond their control.

(4) Clarification of non-salary benefits available to staff. Such benefits are important as incentives to staff who do not receive immediate (and "automatic") promotion to the next grade.

DISTRIBUTION OF PROFESSIONAL STAFF BY GRADE AND SALARY STEP WITHIN GRADE

	Grade3	Grade4	Grade5	Grade6	Grade7	Grade8	Grade9	Grade10
17745								1
16975								
16275							1	
15575							1	
14935							1	
14295						3	1	
13695						5		
13095					21	2		
12535					19	4		
11975				1	33	4		
11415				5	26		0	0
10855				4	29		0	
10365				7	15	0	0	
875				13	11	2		
9385			1	23	8	0		
8895				44	9			
8475				99	0			
8055			1	124				
7635			1	54				
7285			5	27				
6935			46	1				
6585			94					
6305		1	65					
6025			32					
5745	1		41					
5465		5	63					
5205		22	51					
4945		75	0					
4685		72						
4425		69						
4165		72						
3955	4	37						
3745	0	0						
3535	8							
3325	17							
3115	36							
2905	29							
2755	4							
TOTAL	99	353	400	402	171	20	4	1

BOXES SHOW STAFF @ CROSSOVER POINTS AND BELOW

SALARY SCALES - BY GRADE AND STEP WITHIN GRADE

GRADE STEP	Grade3	Grade4	Grade5	Grade6	Grade7	Grade8	Grade9	Grade10
14	5745	7285	9385					
13	5465	6935	8895	12535				
12	5205	6585	8475	11975				
11	4945	6305	8055	11415				
10	4685	6025	7635	10855	13095	14295	15575	16975
9	4425	5745	7285	10365	12535	13695	14935	16275
8	4165	5465	6935	9875	11975	13095	14295	15575
7	3955	5205	6585	9385	11415	12535	13695	14935
6	3745	4945	6305	8895	10855	11975	13095	14295
5	3535	4685	6025	8475	10365	11415	12535	13695
4	3325	4425	5745	8055	9875	10855	11975	13095
3	3115	4165	5465	7635	9385	10365	11415	12535
2	2905	3955	5205	7285	8895	9875	10855	11975
1	2765	3745	4945	6935	8475	9385	10365	11415