

## CHAPTER 7

### SPECIALISTS' EXTENSION ACTIVITIES

#### Introduction

This chapter summarizes the characteristics of the survey respondents (responses to questions IS1-4 and P1-2), their extension activities (questions IS9-12), and the problems they face (questions P3-4). The next chapter describes the information sources they use (IS5-6 and P5-8) and their information needs (P9). The following chapter attempts to explain why respondents use the sources they do (questions IS5-6).

Frequencies of responses for both questionnaires are given in Appendices 5 and 6.

#### Presentation of results

I have used three methods of presenting numerical material in this and subsequent chapters: text, tables and graphs. The graphs are discussed in Chapter 9. I here describe the conventions used in the text and tables to indicate the statistical significance of findings.

A single asterisk (\*) indicates a statistically significant difference from zero at the  $p = 0.05$  level. Two asterisks (\*\*) denote significance at  $p = 0.01$ . These apply to chi-square values and regression slopes.

Several tables compare values of interval-level variables among subgroups of respondents (e.g., Table 7.11). Table 7.1 (drawing on the data presented in Table 9.7) provides an example. The letters *a*, *b* and *c* denote vertical comparisons -- across rows within the same column. The letters *x*, *y* and *z* denote horizontal comparisons -- across columns within the same row.

Thus in the first column (dashed outlines), AIC publications (4.94 a), the agricultural

**Table 7.1** Example of presentation of statistically significant differences among subgroups of respondents as identified by analysis of variance.<sup>a</sup>

Source type	Institution			Overall
	Province	District	AIC	
AIC publications	4.94 a	5.34 a		5.21 a
Agricultural press	5.50 a	5.39 a	6.18	5.63 a
AARD publications	5.75 a xy	5.26 a x	6.19 y	5.63 a
Other specialists	<b>6.65</b> b	<b>6.53</b> b	<b>6.53</b>	<b>6.56</b> b
Overall	5.71 x	5.61 x	6.29 y	5.79

<sup>a</sup> Common letters a-c in a column and x-z in a row indicate no significant difference at  $p = 0.05$  by Student-Newman-Keul's multiple range test. Highest scores in each column are in **boldface**; lowest scores are *italicized*. See the text for discussion of the outlined and shaded cells.

press (5.50 a), and AARD publications (5.75 a) are all followed by the letter *a*; they are thus *not* significantly different from each other. All are, however, significantly different from other specialists (6.65 b) -- the only figure in the column followed by a *b*.

The same pattern is true for the second column, (district specialists) and the fourth (Overall). The third column contains no *a*'s or *b*'s, so no significant differences exist among the three figures in this column.

Comparisons across columns within the same row are denoted by the letters *x* and *y*. Thus for AARD publications (row outlined by dotted lines), district specialists (5.26 *x*) are not significantly different from province specialists (5.75 *xy*), since both figures are followed by an *x*. Similarly, AIC specialists (6.19 *y*) are not different from province SMSs (5.75 *xy*) but *are* different from those at district offices (5.26 *x*).

Of the other four rows, only the final one (Overall) contained significant differences, as denoted by the letters *x* and *y* following figures in this row.

Note that these comparisons are only valid within a single column or row. For instance, the table does not tell us whether the two shaded cells in the table are significantly different. Nor are comparisons between a subgroup (e.g., either of the shaded cells) and an "overall" figure (rightmost column or the bottom row) valid.

To ease the rapid reading of some tables, I have used **boldface** to denote the highest value in a column, and *italics* to mark the smallest.

Superscript letters <sup>a</sup>, <sup>b</sup>, etc., are used in tables to denote footnotes.

**Table 7.2** Sampling and response rates from Information Sources and Publications questionnaires.

	Province		District		AIC		Total	
Estimated population	437		956		167		1560	
Weighting factor <sup>a</sup>	28%		61%		11%		100%	
<b>Information sources questionnaire</b>								
Sample size	103		203		83		389	
Valid responses	68	66%	149	73%	63	76%	280	72%
<b>Publications questionnaire</b>								
Sample size	44		108		67		219	
Valid responses	36	82%	73	68%	56	84%	165	75%
<b>Overall</b>								
Sample size	147		311		150		608	
Valid responses	104	71%	222	71%	119	79%	445	73%

<sup>a</sup> Figures used to weight data when calculating point estimates. Note that these weights assume that fisheries and estate crops SMSs (excluded from the non-AIC sample) have similar characteristics to the food crops and livestock specialists surveyed.

### Response rate

A total of 456 people returned the questionnaires before the cutoff date of 4 January 1992 (110 days after the first mailing). This represented a response rate of 75%. Of these, 11 persons indicated they were not extension subject-matter specialists, leaving 445 valid responses (73%).

Table 7.2 presents sampling and response rates for the various groups sampled. Around 80% of Agricultural Information Center personnel returned questionnaires, while only 70% of provincial and district officials did so.

Response rates varied among provinces also, with 100% of all specialists surveyed in Bengkulu and Central Sulawesi returning their questionnaire, but only 44% in Lampung, 53% in East Kalimantan, 54% in North Sumatra, and 56% in Aceh doing so. The reasons for the differences among provinces are unclear. Surprisingly, updated address lists did not seem to produce significantly higher response rates than the older lists.

The overall response rate of 73% can be regarded as excellent, especially given the doubtful validity of the original address lists. For those 11 provinces where updated (1991)

**Table 7.3** Respondents' institutional affiliation<sup>a</sup>.

	Province		District		AIC		Overall % <sup>b</sup>
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
Kanwil	8	7.7	- <sup>c</sup>		- <sup>c</sup>		2.2
Dinas	46	44.2	102	45.9	- <sup>c</sup>		40.5
Bimas	49	47.1	120	54.1	- <sup>c</sup>		46.3
AIC/other	1	1.0	0		119	100	11.0
<b>Total</b>	<b>104</b>	<b>100</b>	<b>222</b>	<b>100</b>	<b>119</b>	<b>100</b>	<b>100</b>

<sup>a</sup> Combined data from both questionnaires, questions IS2.1 and P2.1. *n* = 445.

<sup>b</sup> Weighted for proportions of total specialist population in each group.

<sup>c</sup> Does not apply.

lists were available, the updates indicated that we might expect some 15% of the total addresses sampled to be incorrect. Allowing for this, we can calculate a true overall response rate of 88% by current extension specialists sampled. In view of the adequate response, it was not considered necessary to send a follow-up mailing to non-respondents.

### Personal characteristics

The two questionnaires contained several identical items about the respondents' personal characteristics: institutional affiliation, specialization, years as an extension specialist, and gender. These data are combined here for convenience of presentation. There were no significant differences in personal characteristics between the specialists responding to the two questionnaires except, inexplicably, a relative over-representation of women among Publications questionnaire respondents.

### Institutional affiliation

Two-thirds (68.1%) of the non-AIC specialists were based at district offices, with slightly more at *Bimas* than at *Dinas* institutions (Table 7.3). Roughly equal numbers were based at provincial *Bimas* and *Dinas* offices, while few worked at the *Kanwil*.

Weighting the responses for the different sampling percentages, the survey revealed that about 2% of all Indonesia's extension specialists work at *Kanwils* (about one person in each province), 12.4% are based at provincial *Dinas* and 13.2% at provincial *Bimas* offices, and 10.7% at Agricultural Information Centers. More than half the specialists work at district *Dinas* (28.2%) and *Bimas* offices (33.1%).

Differences in the duties and information seeking behavior of specialists based at the *Bimas* and *Dinas* offices were minor, and they are treated as a single group in subsequent analysis. Any distinction between extension personnel in these offices is likely to disappear with the current changes in the organizational structure of extension in Indonesia.

Tests showed that provincial and district level staff differed significantly in their extension activities (see 7.14 and Table 8.1). Subsequent analysis therefore separated these two groups.

One hundred and nineteen specialists worked at Indonesia's 28 Agricultural Information Centers (one national and 27 provincial). These, too, had rather different duties from the provincial and district staff, so are kept separate in analysis.

### Specialization

Differences in policies among Indonesia's provinces and in respondents' reporting mean it is difficult to assign some respondents to certain categories. In some provinces, extensionists specialize in the broad commodity groups of "food crops" or "livestock." In others they are given more specific disciplines or sub-specialties, such as "soil conservation," "mechanization," or "economics," but continue to focus on a certain commodity group. In still other provinces, and in the AICs, some specialists are entirely discipline- rather than commodity-oriented. Some respondents reported their sub-specialty but not their commodity group (if indeed they had one). Table 7.4 reflects these difficulties in categorizing such respondents.

This table shows that roughly one-quarter of the provincial and district respondents specialize in livestock, while two-thirds focus on food crops. A small number of respondents specializing in fisheries and other topics were inadvertently included in the

**Table 7.4** Specialization of respondents<sup>a</sup>.

	Province		District		AIC	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Livestock	23	23.0	57	27.1	26	22.4
Food crops <sup>b</sup>	66	66.0	144	68.6	48	41.4
Other <sup>c</sup>	11	11.0	9	4.3	42	36.2
Total	100	100	210	100	116	100

<sup>a</sup> Combined data from both questionnaires, questions IS2.2 and P2.2. *n* = 426.

<sup>b</sup> Includes 20 social science and economics specialists and 25 soils, mechanization and post-harvest specialists who probably focus primarily on food crops.

<sup>c</sup> Includes estate crops, fisheries, conservation and extension. Questionnaires were not sent to respondents at district and provincial offices known to be in these categories. Estimates for the whole specialist population therefore cannot be calculated.

sample. They are excluded from subsequent analysis that compares the two major groupings, food crops and livestock.

**Table 7.5** Education of respondents by institutional affiliation<sup>a</sup>.

	Province		District		AIC		Overall % <sup>b</sup>
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
<i>Sarjana</i>	48	75.0	137	100	51	86.4	91.5
Master's	16	25.0	0	0	8	13.6	8.5
Total	64	100	137	100	59	100	100

Chi square = 34.42\*\*.

<sup>a</sup> Data from question IS2.3. *n* = 260.

<sup>b</sup> Weighted for proportions of total specialist population in each group.

## Education

All specialists providing usable responses held at least a *sarjana* degree (four years plus thesis, roughly equivalent to a U.S. honors bachelor's degree). Several held a master's in addition (Table 7.5). None had a doctorate: presumably Ph.D.s are promoted out of the specialist role when they obtain their degree. A number stated that they had attended a university but did not indicate whether they had earned a degree. They are excluded from this analysis.

None of the specialists at the district level had a master's degree, while one-quarter of those at the provincial level did. AIC respondents were intermediate. Overall, an estimated 8.5% of all specialists held a master's degree.

It seems either that provincial level staff have greater opportunities for advanced study, or that those with advanced degrees are transferred to provincial offices as they gain their degrees. The basic salary for Indonesian government officials is low, and the opportunity for further study is often used as a reward for superior service.

## Work experience

The median length of service as an extension specialist was six years, with responses ranging from less than a year to 20 years. More than 80% had 8 years or less experience in such positions, reflecting how recently most specialists' positions had been established and possibly the rapidity of turnover (including promotion to higher positions) among specialists.

Respondents at provincial offices had significantly more work experience (mean = 9.2 years) than those at the AICs (6.1 years) or the district level (6.0 years) (significant at  $p = 0.05$  level by Student-Newman-Keul's test). This reinforces the suspicion that senior specialists transfer to provincial offices after working for a period at the district level.

## Gender

Women were under-represented in all the institutions surveyed, and account for only 20% of all specialists (estimated by weighting for the different sampling rates). They are especially uncommon at the provincial and district offices, where less than one in five specialists was female (Table 7.6). At the Agricultural Information Centers, however, they accounted for one-third of respondents.

The reasons for this cannot be ascertained from these data, but may be related to the nature of the work. The jobs of district specialists involve much travel, often over difficult terrain and with overnight stays (see Table 7.14). These specialists also meet with more farmers, and the Indonesian extension services usually deal with male rather than female farmers. Indonesian society traditionally deters (though does not prohibit) women from engaging in such activities, particularly alone. The AIC specialists (and province) typically travel less and meet fewer farmers. Qualified women may therefore eschew the district and provincial level specialist jobs. On the other hand, the unbalanced numbers of males and females in the provincial and district level jobs may reflect a lack of female graduates in agriculture or a hiring bias against women on the part of local authorities. Further investigation would be necessary to determine the causes and effects of this imbalance.

**Table 7.6** Gender of respondents by institutional affiliation.

	Province		District		AIC		Overall% <sup>b</sup>
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
Male	83	79.8	184	82.9	78	66.7	80.3
Female	21	20.2	38	17.1	39	33.3	19.7
Total	104	100	222	100	117	100	100

Chi square = 11.95\*\*<sup>a</sup> Combined data from questions IS2.5 and P2.4.  $n = 443$ .<sup>b</sup>

Weighted for proportions of total specialist population in each group.

**Table 7.7** Urban/rural background of respondents by institutional affiliation.<sup>a</sup>

	Province		District		AIC		Overall% <sup>b</sup>
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
Urban	34	50.0	69	46.6	40	63.5	49.4
Rural	34	50.0	79	53.4	23	36.5	50.6
Total	68	100	148	100	63	100	100

Chi square = 5.09<sup>ns</sup> (significant at  $p = 0.078$ ). Chi square for (province + district) vs AIC = 4.87\*<sup>a</sup> Data from question IS2.6.  $n = 279$ .<sup>b</sup> Weighted for proportions of total specialist population in each group.

### Rural and farming backgrounds

About half of the respondents at provincial and district offices were brought up in a village, while AIC personnel were rather more urban in background (Table 7.7). This difference was significant at  $p = 0.05$  (chi-square = 4.87\*). More AIC staff than local personnel stemmed from non-farm families (35% compared to 47%), though this difference was not significant (Table 7.8).

Specialists brought up in the countryside tended to come from a farm family: of 135 respondents brought up in a village, 100 claimed a farm background, while only 22 of 139 specialists from urban areas did so (chi-square = 94.07\*\*).

The relatively large proportion of specialists with rural backgrounds could be seen as encouraging given the apparent urban bias among Indonesian government officials. But that nearly half of the country's extensionists do *not* have such a background is somewhat of concern given the need for extension specialists to understand and empathize with farm

**Table 7.8** Farm background of respondents by institutional affiliation.

	Province		District		AIC		Overall% <sup>b</sup>
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
Farm family	36	52.9	79	53.4	38	64.4	54.4
Not farm family	32	47.1	69	46.6	21	35.6	45.6
Total	68	100	148	100	59	100	100

Chi square = 2.34<sup>ns</sup>.<sup>a</sup> Data from question IS2.7.  $n = 275$ .<sup>b</sup> Weighted for proportions of total specialist population in each group.

families.

### Other activities

About 15% of respondents at provincial offices and AICs reported that they had outside income-generating activities, while significantly more district specialists (over one-third) did so (Table 7.9). Overall, about one-quarter of Indonesia's extension specialists are estimated to have outside work. (This figure does not include any extra income respondents may receive in the form of travel per diems or emoluments for service on committees.)

The most common types of additional activities were teaching at high schools and universities (26 respondents) and additional duties in the specialist's office, such as coordinating the local *Bimas* program (20 respondents). Only 12 individuals (11 of whom were at district offices) were engaged in farming.

There is considerable economic pressure on extensionists, as on other government employees, to supplement their incomes with other activities. It would seem that such pressure, or the opportunity for outside employment, is greater for extensionists working at the district rather than the provincial level.

### Wealth

It would be inappropriate in Indonesian society to ask respondents how much they earned, and many respondents would be unable to provide an accurate response anyway. Respondents' wealth was therefore measured instead, by a series of substitute measures: by asking whether they owned a series of items, including land, housing, vehicles, and electrical equipment. The inclusion of electrical equipment is justified by the expectation that most specialists live and have their offices in towns, which unlike many villages, are typically supplied with electricity. The questions included the word "private" (e.g., "private motorbike") to exclude the respondents' use of government-owned items.

The most common item was a color television, owned by 211 of 279 respondents

**Table 7.9** Other work of respondents by institutional affiliation.

	Province		District		AIC		Overall% <sup>b</sup>
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
Other work	10	14.9	51	34.5	10	16.4	27.1
No other work	57	85.1	97	65.5	51	83.6	72.9
Total	67	100	148	100	61	100	100

Chi square = 22.60\*\*<sup>a</sup> Data from question IS2.8. *n* = 276.<sup>b</sup> Weighted for proportions of total specialist population in each group.

overall (the questionnaire did not mention ownership of a black-and-white set). This was followed by a refrigerator, house, motorbike, stereo, and land (Table 7.10). Relatively few owned a video recorder or a car. The pretest also asked about a telephone, but this item was deleted because so few respondents reported having one and because owning a phone depends as much on the availability of service as on wealth.

Summing scores on these questions created an index of wealth. Twenty-nine respondents reported having none of the items, while 5 owned all. The median response was 2 items, typically a television and fridge. Comparing the index across institutions shows that province specialists were significantly wealthier (mean of 3.44 items) than those in district offices (2.42 items) (significant at  $p = 0.05$  by Scheffé's test). Specialists at AICs (2.87 items) were intermediate in wealth.

### Work time

**Table 7.10** Wealth, as reflected by number of respondents who own selected items<sup>a</sup>.

Item	<i>n</i>	%
Color television	211	75.6
Refrigerator	112	40.1
House	99	35.5
Motorbike	95	34.1
Stereo	92	33.0
Land	84	30.1
Video recorder	46	16.5
Car	34	12.2

<sup>a</sup> Data from question IS2.9.  $n = 279$ .

The median respondent reported working a total of 42 hours a week. This is probably only a slight overestimate, given that the official Indonesian work week is 38 hours long and many specialists also visit the field outside office time. However, this figure conceals a very wide range, from only 7 to as many as 119 hours a week (or 17 hours a day, 7 days a week!). Further analysis on work time was conducted after removing such outliers (Table 7.11).

**Table 7.12** Percentage of work time respondents spent solving field problems and providing information from "above"<sup>a</sup>.

	Province	District	AIC
Solving field problems	57.9 b	56.6 b	47.1 a
Providing information from "above"	42.1 a	43.4 a	52.9 b

<sup>a</sup> Data from question IS4.  $n = 269$ . Figures in a row followed by the same letter are not significantly different at  $p = 0.05$  by Scheffé's test.

There was no difference between the total amount of time worked by respondents at the three different groups of institutions. Overall, respondents spent about one-quarter of their time seeking information, a little more than a quarter providing it to clients, about the same amount in administrative work, and the remainder in other activities (such as meetings and sport).

However, AIC staff spent significantly more time seeking information and less in administrative duties than did their counterparts in other institutions.

**Table 7.11** Time respondents spent per week on various activities, by institutional affiliation.<sup>a</sup>

	Province		District		AIC	
	hours	%	hours	%	hours	%
Seeking info	9.9 a	23.6	9.0 a	21.4	13.8 b	32.6
Providing info	10.2	24.3	11.7	27.8	11.9	28.1
Admini- stration	12.7 b	30.2	13.3 b	31.6	8.9 a	21.0
Other	9.2	21.9	8.1	19.2	7.7	18.2
Total	42.0	100	42.1	100	42.3	99.9

<sup>a</sup> Data from questions IS3.1-3.5.  $n = 254$ . Figures in a row followed by the same letter are not significantly different at  $p = 0.05$  by Scheffé's test.

It should be remembered that it is difficult to obtain accurate information about time allocation. Many factors including genuine errors as well as willful misreporting, can bias a respondent's reporting to the socially acceptable. The figures in Table 7.11 should therefore be taken as indicating a general tendency rather than the actual numbers of hours spent.

## **Field vs. central orientation**

### **Time allocation**

Question IS4 asked respondents what percentage of their time they spent "solving field problems" as opposed to "promoting messages from above." Respondents reported spending a mean of 55% of their time doing the former and 45% doing the latter (Table 7.12). (The question requested that the two percentages sum to 100%.)

Most respondents balanced roughly equally the time spent in each activity: only 18.6% of respondents spent more than 70% of their time performing either activity. Perhaps this marked central tendency is due to the social desirability of both activities: as extensionists, respondents are supposed to have farmers' interests at heart, while as civil servants they are to promote administration policies. Indeed, several respondents indicated on the questionnaire that the two coincided: i.e., that by disseminating government messages they are also solving field problems, and vice-versa.

How much time specialists spent in each activity depended on where they worked. Provincial and district respondents said they spent 57 to 58% of their time solving field problems, significantly more (by Scheffé's test,  $p = 0.05$ ) than the 47% that AIC specialists devoted to such work. It thus seems that the local personnel were rather more field-oriented than those in the AICs.

### **Independence from central decision making**

Questions IS12.1 and 12.2 measured the respondents' independence from central decision making. Maximum independence is desirable from one point of view, but is undesirable from another. Specialists with the autonomy to adjust technical recommendations can provide farmers and field agents with advice suited to local conditions. But if such flexibility is to be fruitful, it must be based on adequate local technology testing, technical backup such as soil analyses and reliable sources of seed, and skilled local personnel (including extension specialists and field agents). Such preconditions do not exist in many parts of Indonesia.

The overwhelming majority of respondents (95.7%) agreed or somewhat agreed that recommendations from above must be tested before being extended. And nearly three-quarters disagreed or somewhat disagreed with the statement that central recommendations could not be changed before being extended.

While they were worded to tap the same concept -- autonomy from central decision making -- there was only a relatively weak correlation between responses to the two statements ( $r = -.16$ ,  $p = .05$ ) (the negative correlation was expected as question IS12.2 was negatively worded). For this reason the two questions are treated separately in the analysis below.

Respondents at the three types of institutions differed somewhat in opinion (Table 7.13). Provincial level respondents appeared to favor local autonomy in adapting central

recommendations slightly (though not necessarily significantly) more than did their counterparts at other institutions. They agreed most strongly that central recommendations must be tested and could be changed before being extended.

AIC specialists were the most cautious of the three groups, with somewhat less support for local testing and alterations. These differences were merely relative, however; AIC specialists still came down strongly in favor of local autonomy in testing and adapting recommendations. Women respondents were more cautious than men, but this was probably because they were over-represented in the AICs.

Senior specialists (as measured by years of service) were more prone to favor local autonomy than were their younger colleagues. And wealthier respondents, as measured by the number of items they owned (question IS2.9) favored local testing and autonomy. There was no relationship between other demographic variables and attitudes toward local adaptation and testing.

Personal interviews with specialists reinforced this finding of strong support for local autonomy. Specialists saw Ministry recommendations as flexible guidelines that could be adjusted to local conditions and needs rather than as strict, unalterable rules. They said they were allowed to, and frequently did, change recommendations that were inappropriate to their locality.

But their source of information on whether and how to change recommendations is somewhat of a mystery. The survey shows that specialists rarely conduct field trials -- the median specialist had conducted just one trial in the previous year (Table 7.14). Even allowing for exchange of information on trials among specialists, the range and variety of soils and climates in each district or province means that the number of such trials is totally inadequate.

The data suggest that instead of research or formal trials, specialists (especially the more experienced ones) base their technology recommendations on informal, interpersonal information sources. These sources -- farmers and field agents, other specialists, superiors and colleagues, and the specialists' own experience -- were the top six ranked information sources overall (see Table 8.1). Several interviewees suggested they also modified recommendations for non-technical reasons, especially economics and marketing, for

**Table 7.13** Respondents' opinion about central recommendations<sup>a</sup>.

Statement	Province	District	AIC
Recommendations from "above" must be tested before being extended <sup>b</sup>	6.71 <sup>c</sup>	6.44	6.26
Recommendations from "above" may not be changed before being extended <sup>b</sup>	2.88	3.18	3.29

<sup>a</sup> Data from questions IS12.1 and 12.2. Scale = 1 (disagree with statement) to 7 (agree).  $n = 270 - 278$ .<sup>b</sup> Not significant at  $p = 0.05$  by Scheffé's test. <sup>c</sup> Province-district and province-AIC contrasts were significantly different at  $p = 0.05$ .

instance reducing recommended fertilizer dosages if farmers were unable to purchase the full amount.

The evidence points to specialists' and other agricultural service staff's developing a flexible series of recommendations, often by adapting central Ministry advice to be sensitive to local economic and biophysical conditions. These recommendations are based primarily on observations as to what works on farms and what farmers can afford, rather than on formal trials.

The advantages of this system are obvious. Recommendations are locally relevant and can be changed as necessary without recourse to higher administration. It is possible to take full advantage of indigenous knowledge and farmers' initiative, to feed such knowledge into the extension system, and spread it to nearby areas. And local decision making relieves the burden on higher administration and the research and development system.

But there are also disadvantages. Links with research and the formal testing of technologies are extremely limited. Because of the lack of formal testing, there is an inflated risk of promoting ineffective practices -- especially given the low caliber of some extension personnel. For instance, some technology packages are ineffective unless applied in full: pest management practices are an example of this. There is also a possibility of confusion among conflicting recommendations, and little opportunity for message reinforcement through extension publications or the mass media. And the lack of feedback to research may cause scientists to pursue topics of little local relevance.

### **Extension activities**

Questions IS9 to 11 asked how many times the respondent had performed certain extension and information seeking activities. Responses to these questions are summarized in Table 7.14.

**Table 7.14** Number of times respondents engaged in extension and information seeking activities, by institutional affiliation. 149

Source <sup>b</sup>	Province	District	AIC	Overall	
				Mean	Median
<b>In previous 3 months</b>					
Visits to farmers	8.5 a	16.0 b	6.9 a	12.1	9
Visits to Rural Extension Centers	7.2 a	12.0 b	4.6 a	9.3	7
Sought information to answer agents' or farmers' questions	4.9	6.1	4.6	5.5	3
Read scientific journal articles	6.4	7.3	9.0	7.5	4
Read AARD books	3.7	3.5	5.1	3.9	2
<b>In previous year</b>					
Conducted field technology tests	1.5 b	1.9 b	0.6 a	1.5	1
Traveled to seek extension information	3.9 ab	3.9 a	6.0 b	4.3	3
Attended extension training	0.5 a	0.5 a	0.9 b	0.6	0
<b>In previous 3 years<sup>b</sup></b>					
Attended AARD training	0.4	0.6	0.6	0.5	0
Collaborated in AARD research	0.2	0.7	0.2	0.4	0
Attended research exhibition or seminar	2.4	1.6	2.3	1.9	1
Attended technical meeting with AARD researchers	3.1	2.3	3.1	2.7	2
Visited (or received visit by) AARD researcher	2.2	1.7	2.3	1.9	1
Wrote letter to research institute	0.6	0.5	0.5	0.6	0
Provided information to researchers	2.2	1.4	1.7	1.6	1

<sup>a</sup> Data from questions IS9.1 to 11.7.  $n = 261$  to  $272$ . Figures in a row followed by the same letter are not significantly different at  $p = 0.05$  by Scheffé's test. <sup>b</sup> Adjusted for specialists who had worked less than 3 years. Outliers (respondents performing the activity more than 12 times in the previous 3 years) were dropped.

Four possible sources of error were encountered in analyzing responses to these questions. One was the question wording, which might be interpreted in different ways. A typical question was "How many times in the last three months have you visited farmers?," with the space for the response labeled "\_\_\_\_\_ times." It is possible that some respondents misinterpreted this as "How many individual farmers have you visited?" and responded accordingly.

Such confusion -- if it occurred -- would have two effects:

- It would reduce the validity of the responses, diminishing our confidence in the means shown in Table 7.14, thereby possibly increasing the chances of spurious significant differences between the means.
- It would inflate the error term, reducing the likelihood of obtaining statistically significant differences between subgroups. This makes any significance found all the more credible, and opens the possibility that non-significant differences between groups of respondents reflect genuine differences.

The second problem involved outliers. Some specialists reported performing an activity with unusual frequency. Sometimes their claims strained credibility. For instance, one claimed to have read 285 scientific articles in the previous 3 months, or more than 3.5 a day -- a voraciousness matched by few university faculty with far easier access to literature. Another purportedly had collaborated in 20 AARD research projects in three years, more than three times as many as any other respondent. Cases with extreme outliers were deleted from analysis of the relevant variable. A maximum of six cases (of an  $n$  of 267) were thus dropped for any one variable.

The third possible source of error in responses to questions IS9 to IS11 was that all relied on respondents' memory. The time periods (three months, one year, and three years) were selected to be appropriate to the type of activity measured: someone ought to be able to remember whether he or she had attended training in the previous three years, for instance. Nevertheless, it is possible that some errors occurred because of poor recall. It is difficult to predict which direction, positive or negative, this would tend to skew results.

The fourth possible source of error was that of misreporting. All the activities in Table 7.14 are desirable for extension specialists to perform. Respondents may therefore have over-reported the frequency they had performed certain activities (the "halo effect").

While Table 7.14 must be interpreted with these caveats in mind, it should be added that the figures are comparable with those reported by Hussein (1986), and broadly agree with responses of the specialists I interviewed in person. In particular, there seems to be little halo effect given the low levels of many means and the willingness of respondents to admit they had not engaged in certain activities at all during the period in question. I therefore conclude that the figures given in the table are fairly accurate.

## Field visits

The median respondent had made nine visits to farmers and seven to Rural Extension Centers in the previous three months (Table 7.14). Five respondents (three of whom were at AICs) had visited no farmers, while three had visited no RECs. At the other end of the scale, one district specialist claimed to have made 87 farm visits (more than one every work day), while another had visited RECs 77 times.

As might be expected, district level personnel made significantly more of these field visits than did those at the provincial offices or AICs.

District personnel had made a mean of 16 visits to farmers and 12 to RECs in the previous 3 months, nearly twice the level of respondents in the other two institution types. If each visit occurs on a different day, this means that district personnel spend 16 of 78 workdays in 3 months, or one day in every five, visiting farmers. If they visit RECs on different days from their farm visits, they spend an additional 12 of 78 workdays, or one day in every 6.5, at RECs. Given these unlikely assumptions (since a specialist may make more than one farm visit a day, and interviewees said they often visited farmers and RECs on the same day), district specialists thus spend a maximum of about one-third of their work time visiting the field. When we compare this to the 28% of their time they said they spent disseminating information (in response to Questions IS3.1 and 3.5, Table 7.11), we see this estimate is not too far off the mark.

Provincial and AIC specialists devoted far less time to field visits. Provincial respondents had visited farmers on 8.5 occasions (once every nine days), and RECs 7.2 times (once every 11 days) in the previous 3 months (Table 7.14). Corresponding figures for AIC specialists were once every 11 days to farmers and every 17 days to RECs.

Province and AIC specialists also disseminate information by methods other than personal contacts and to audiences other than field agents and farmers. Comparing the number of field visits with the total time spent disseminating information (Table 7.11) can give us an idea of the effort devoted to these other methods and audiences. Using reasoning similar to that for district specialists above, we can conclude that province SMSs spend about 15-20% of their time in the field, and that this accounts for about two-thirds of their total information dissemination activities. AIC specialists, by contrast, spend about 12-15% of their time in the field, accounting for less than half of the time they spend disseminating information. Of course these are estimates only, but they do give some idea of the relative importance of field activities for SMSs in the three types of institutions.

The respondents' education, sex, place brought up, and wealth (questions IS2.3, 2.5, 2.6 and 2.9) had no effect on the number of farmer visits they made. None of the demographic variables had any effect on the number of REC visits made.

Livestock specialists (question IS2.2), junior specialists (question IS2.4) respondents from farm families (question IS2.7) and those who had outside activities in farming (IS2.8) reported visiting significantly more farmers than did their colleagues. Livestock specialists had made a mean of 16.5 visits in the previous 3 months, compared to

11.8 by food crops specialists ( $F_{1,172} = 4.54, p = .03$ ). Junior specialists (those with fewer years of on-the-job experience) made more farm visits than did their senior colleagues (beta =  $-.13, p = .04$ ), presumably because the latter are more engaged in administrative work. Respondents from farm families had made a mean of 15 visits in the three months, compared to only 10 for those from non-farm backgrounds ( $F_{1,263} = 8.82, p = .003$ ). And respondents with farming activities outside their SMS job made a mean of 25 visits, compared with 11 visits for those with no outside work ( $F_{4,262} = 6.32, p = .0001$ ). These relationships held even if the respondent's institution was controlled for.

### **Information seeking**

Seeking answers to clients' questions Respondents stated that they had sought information to answer questions from field agents or farmers a median of three times (mean of 5.5) in the previous three months, or once every 26 work days (Table 7.14). Some 34 respondents indicated that they had not sought such information in this period. The modal response was twice.

District respondents, who are in much more frequent contact with field agents and clients, had sought such information a mean of six times in this period, but this was not significantly more than specialists in the other institutions.

None of the other demographic characteristics (questions IS2.1 to 2.9) had any effect on the frequency respondents sought information to answer clients' questions.

Reading research publications The median respondent reported reading four articles in scientific journals in the previous three months, or one every 20 work days (Table 7.14). The mean was 7.5 articles, and the modal response was three. The median respondent had read two books published by AARD in the same period, or one every 39 work days (mean of four books and mode of one). Twenty-eight specialists had read no articles, and 38 had read no AARD books.

Agricultural Information Center specialists appeared to read such literature somewhat more often than their colleagues at other institutions, though Scheffé's test revealed no significant differences. A *t*-test comparing AIC specialists' book reading (mean of 5.1 in 3 months) with that of district staff (mean of 3.5) yielded a significant difference, however.

It is indeed somewhat surprising that district specialists report reading so many research publications, since most of these publications are distributed to AICs and provincial offices but not to the district level. Perhaps respondents understood something different from what was intended in questions IS9.4 and 9.5. For instance, they may have included AARD's quarterly newsletter, *Warta Litbang*, as a "book" or a "scientific journal," or misidentified non-AARD publications as published by the research agency. The personal interviews suggested that many specialists do not correctly identify the publishers of research and extension publications.

None of the other demographic measures (questions IS2.1 to 2.9) had any effect on the frequency of reading research publications.

Technology testing The median respondent had conducted just one field technology test in the previous year (Table 7.14). There was a wide variation in the number of tests conducted, with one respondent claiming to have performed 24, and another 20. But 84% of respondents had conducted two or fewer tests, and more than a quarter of the respondents had performed none. District and provincial specialists conducted significantly more tests than AIC respondents.

Livestock specialists had made significantly fewer field technology tests (mean of 1.2) in the past year than had food crops specialists (mean of 2.1) ( $F_{1, 175} = 12.52$ ).

Men respondents had conducted a mean of 1.6 field tests in the previous year, significantly more than the 1.1 tests women respondents had performed ( $F_{1, 268} = 4.34$ ,  $p = .04$ ). This was because there were more women at AICs than in the other institution types: when institution was controlled for, the relationship between sex and number of tests disappeared. None of the other demographic characteristics affected the number of tests performed.

Traveling to seek information Another measure of information seeking was the number of out-of-town trips made to obtain information for extension purposes. The median specialist had made three such trips in the previous year, though the most traveled respondent reported making as many as 70 (one every 4.5 work days) (Table 7.14). This high number may reflect a broad interpretation of the terms "out-of-town" and "trips to seek information for extension purposes," which were not otherwise defined in the questionnaire. The modal value, reported by 18% of respondents, was zero trips.

AIC specialists made significantly more information-seeking trips than other specialists, a mean of six a year, compared to under four by provincial and district respondents. The non-significant difference by Scheffé's test between AIC and provincial specialists reflects the conservative nature of this test; a  $t$ -test comparing these two groups bears a significance level of  $p = 0.017$ . AIC specialists' more frequent travel to seek information contrasts with their less frequent trips to disseminate information (see above).

The only demographic measure to affect the number of out-of-town trips was where the respondent had been brought up. SMSs with an urban background reported making a mean of 5.1 such trips in the previous year, while those from rural areas had made only 3.6 ( $F_{1, 265} = 6.43$ ,  $p = .01$ ). This held even when the institutional level was controlled for. No obvious reason for this difference is apparent.

**Training** Few respondents had recently attended training conducted by either extension or research institutions. Less than half (43%) had attended one or more extension courses in the last year, with most of these (31% of the total) attending just one course (Table 7.14). The mean number of extension courses was 0.6 a year, suggesting that on average a specialist attends such a course once every 1.7 years. AIC specialists were more likely to attend such courses than were their colleagues, on average nearly once a year.

Training at AARD institutes was rather more infrequent. Less than one-third (30%) of respondents had attended such training in the previous three years, reflecting the lack of resources devoted to such activities by the research and extension agencies. Again extrapolating from the mean frequency (0.5 in three years), we can calculate that the average respondent attends training at an AARD institute once every 5.8 years. The three groups of respondents did not differ significantly in the number of AARD training courses they had attended.

Only one of the demographic measures influenced the frequency of extension training: after controlling for institution, female SMSs attended significantly fewer courses than did males ( $F_{1, 245} = 4.27, p = .04$ ).

Two measures affected training at AARD institutes. Respondents with activities in teaching and farming aside from their SMS jobs were less likely to attend AARD training (mean of .17 courses in the last 3 years), while those with activities other than these or additional *Bimas* or *Dinas* duties had attended significantly more (mean of 1.38 courses, twice as often as any other group) ( $F_{4, 261} = 3.11, p = .02$ ). Respondents with no outside activities were intermediate (.50 courses a year). The reasons for these relationships are obscure.

The second demographic measure influencing the frequency of training at AARD institutes was wealth (question IS2.9). Respondents who reported owning more items attended training more frequently than those with fewer items (beta = .19,  $t = 2.87^{**}$ ). This relationship held even when the respondents' institution was controlled for. Again, there is no obvious reason for this relationship.

**Other links with research** Six other measures were used to reflect linkages with research institutions. These were collaboration with AARD research projects; attendance at exhibits, seminars, etc., at research institutes; attendance at technical meetings where researchers were also present; visits to or by researchers; correspondence with researchers; and feedback to research about local field problems. Respondents were asked how many times they had engaged in each activity in the previous three years.

Scores on each of these measures were low (Table 7.14). The median respondent had attended only one exhibition or seminar, had participated in one researcher visit, and had met researchers twice at technical meetings. He or she had collaborated on no research projects, written no letters, and had offered feedback only once to researchers. By these measures, then, direct contacts between researchers and extensionists are dismally small. These figures generally confirm Hussein's (1986) finding of weak research-extension linkages.

These statistics conceal a few specialists who engaged in closer relations with researchers. One had collaborated in 20 research projects, and several had attended 15 or more seminars or exhibitions. Five had met more than 15 times with researchers at technical meetings, while four had received or made 15 or more researcher visits. One unusual specialist claimed to have written 15 letters to researchers in three years, while a group of 12 had provided feedback to researchers on eight or more occasions.

We might expect such individuals to be located close to research institutions or to work for AICs or provincial offices. But neither appeared to be the case: there did not appear to be any pattern, geographical or institutional, in these unusual individuals. Nor did individuals with exceptionally high contacts on one measure appear to have similarly frequent contacts on another. Since fostering close contacts with research is a desirable goal for the extension agencies, investigating the circumstances of these individuals would seem to be fruitful.

Even when the outliers described above are dropped from the analysis, there are few relationships between research contacts and institutional level (Table 7.14). None of the six measures yielded a significant difference among institutions by Scheffé's test. However, two (collaboration in research and technical meetings with researchers) did yield significant *t*-tests among pairs of institutions. District specialists reported collaborating in significantly more research projects (0.7 in three years, compared to 0.2 for other specialists). And provincial specialists attended more technical meetings than did their district equivalents.

The only other demographic variable to affect research contacts was the respondents' family background: those not from a farm family had attended a mean of 2.4 seminars and exhibits in the previous year, while those with a farm background had attended only 1.4 ( $F_{1, 264} = 7.31, p = .007$ ) There is no apparent reason for this relationship, which held even when the respondents' institution was controlled for.

## Summary

The data reveal several general differences among respondents at the three types of institutions. District personnel made more field visits than did province and AIC specialists. Province and district specialists conducted more field tests than did AIC respondents, who appeared to seek information more from the literature than in the field.

Livestock specialists made more farm visits but conducted fewer field technology tests than did their food crops counterparts. The reasons for this are easily understood. Field extension agents have fewer skills in livestock than in food crops, so more of the burden of farm visits falls to SMSs. And conducting field tests is more difficult and expensive for livestock than for food crops, limiting the number that can be performed.

Senior specialists made fewer farm visits than did their junior colleagues (though not significantly fewer REC visits). It is likely that the more experienced SMSs have more administrative duties, preventing them from making as many field visits.

SMSs with a farm background or an outside activity in farming made more farm

visits than those without these characteristics. The questionnaire did not measure whether these visits were associated with the respondents' extension work. It is possible that they took place as part of the respondents' other income-generating activities.

There was no systematic or obvious relationship among other demographic characteristics on one hand and SMSs' extension behavior on the other. The respondent's education, sex and length of service affected none of the extension behaviors measured. Respondents from urban areas were more likely to travel to seek information, while those without farm backgrounds attended more exhibits and seminars. And wealthier SMSs and those with non-extension activities attended more AARD training. Reasons for these relationships are difficult to discern; some may merely represent the occasional "significant" result one should expect to occur due to random variations in a data set.

### **Problems faced**

The Publications questionnaire contained two sets of questions on general extension problems (question P3) and problems specific to the flow of information from research to extension (question P4). Question P3 (Table 7.15) was adapted from Sigman and Swanson's (1984) survey of 50 extension directors worldwide.

**Table 7.15** General problems faced by extension.<sup>a</sup>

Problem	Mean score <sup>b</sup>	Sigman & Swanson rank <sup>c</sup>
<b>Mobility</b> -- Adequate transport for extension personnel to visit farmers	5.75	1
<b>Obtaining information</b> -- Adequacy of information flows from researchers to extensionists	5.70	7 <sup>d</sup>
<b>Technology</b> -- Availability of technology suitable for extension to farmers	5.49	8
<b>Feedback</b> -- Adequacy of information flows from extensionists to researchers	5.33	7 <sup>d</sup>
<b>Technical skills</b> -- Extension personnel's practical skills in absorbing new technologies	5.24	5
<b>Teaching aids</b> -- Availability of teaching materials, printed materials, demonstration kits, etc.	5.21	6
<b>Extension skills</b> -- Extension personnel's skills in teaching and communicating	5.20	2
<b>Rewards</b> -- Payment (moral and material) received for performing extension duties	4.80	- <sup>d</sup>
<b>Facilities</b> -- Teaching and communication facilities for extension personnel (projectors, classrooms, telephones, etc.)	4.76	3
<b>Organization</b> -- Non-extension workload	3.28	4

<sup>a</sup> Data from Publications questionnaire, question P3. Question wording was based on Sigman and Swanson (1984). Differences are due to translation into Indonesian and re-translation into English.

<sup>b</sup> 7 = very important problem; 5 = important problem; 3 = somewhat important problem; 1 = not a problem.

<sup>c</sup> Ranking from Sigman and Swanson's (1984:8) study of 50 extension directors worldwide.

<sup>d</sup> Sigman and Swanson's study combined "Obtaining information" and "Feedback" as "Linkage" (7th) and did not include "Rewards."

## Mobility

Respondents recognized mobility as the most important general problem facing extension (Table 7.15). This echoes Sigman and Swanson's (1984:8) findings. Many SMSs complained during the interviews of the large area they had to cover and the lack of transport facilities, especially of motorbikes. Only one-third of respondents owned their own motorbike, and 12% had their own car (Table 7.10). This meant that it was difficult for them to visit Rural Extension Centers, farmers, or other locations, especially at short notice.

Several interviewees said they borrowed motorbikes from friends or took public transport. But the scarcity of public transport in remote areas and its high cost was a severe constraint to their reaching these areas, with the result that some Rural Extension Centers rarely received a visit from an SMS. That this problem is not confined to SMSs was confirmed by the few field agents I was able to interview.

Two solutions to this problem are obvious: provide SMSs with a vehicle, or increase the amount of funds allocated for transportation costs. A third alternative is to improve the telecommunication facilities available in district offices and villages. This would enable SMSs to perform some activities, such as scheduling meetings, without the need to travel. Unfortunately, all three solutions would be rather expensive.

### **Information**

After mobility, obtaining information from research was a close second as a problem for extension (Table 7.15). It is possible that this result is biased because respondents realized the nature of the questionnaire, which focused on this topic. To forestall this eventuality, the question on extension problems (P3) was placed before any other questions on research information (P4-9). And the difficulty of obtaining research-based information was confirmed in the oral interviews.

Sigman and Swanson's (1984) study combined my categories of "obtaining information" and "feedback" into a single category, "linkage." They found linkage ranked seventh of nine problems. The results of this study clearly disagree with theirs: Indonesian SMSs see both obtaining information (2nd overall) and feedback to research (4th) as major problems.

I explore ways of improving information flows from research to extension in Chapter 11.

### **Technology**

Respondents rated the availability of appropriate technology third among the ten problems listed. This contrasts with Sigman and Swanson's finding of technology as the least important of the eight problems they listed. It can be taken to mean three things:

- Indonesian SMSs are not aware of the range of suitable research-based technologies that are available.

- Such technologies do not exist.
- Such technologies exist, but sufficient adaptive research has not been carried out to test their applicability to local situations.

The first is a communication problem: the technologies already exist, but have not been communicated adequately to the extension audience. This could be overcome relatively easily through more effective use of the available channels.

The second implies a need for more (and a different type of) research, and a revision in the research planning process. For research to address field needs, input from the field is necessary in the form of field surveys and farmer and extension inputs. At present such inputs are rather limited: Hussein (1986:409) found that extension personnel and farmers were the two least important sources of research ideas for AARD scientists.

The third possibility reflects the gap between the mandates of AARD and the local agricultural services (as coordinated by the directorates-general). The former has the mandate for technology generation; the latter have the responsibility for local verification trials, which are performed by the provincial and district SMSs (Abbas et al. 1989:55-57). But insufficient funding means local trials are rare: the median respondent had performed only one trial in the past year, and only 16% reported performing three or more (Table 7.14). And where local trials are conducted on a wide scale, researchers are sometimes critical of the validity of results. There is thus a need for greater funding for local trials, for more AARD involvement in their conduct, and probably for training of SMSs in appropriate research techniques.

It is not possible from this study to discern which, if any, of the three possibilities outlined above is paramount. But it is likely that all three play a role, and that solving the problem of technology availability must involve them all.

## **Feedback**

Poor feedback from extension to research ranked fourth among the problems facing extension in general (Table 7.15). That feedback is indeed poor was documented by Hussein (1986:416-417) and confirmed by this study: both direct contacts and correspondence were infrequent (Table 7.14): the median respondent had attended two meetings with researchers in the past three years, visited a researcher once, written no letters, and claimed to have provided feedback to researchers just once.

It is easy to blame the SMSs for their inactivity in providing feedback to researchers. But research managers should seek ways of stimulating such feedback, such as inviting comments from extensionists and farmers on new technologies, involving them in research planning and technology testing, and including local suggestions in research protocols.

Farming systems research projects are ideal vehicles for such interactions, but too often they are seen merely as AARD research that is performed in the field, rather than a

collaborative effort by all parties. And FSR projects are too scattered to allow a significant proportion of SMSs and field agents to participate in or even visit them. There is a need for a broader mechanism to generate feedback to research. Recent moves to discover technology needs in each province are encouraging in this regard (Tjitropranoto 1990).

### **Technical skills**

Extension personnel's lack of technical skills ranked fifth among the ten problems listed (Table 7.15). (Sigman and Swanson's [1984:8] study also ranked this fifth.) This study did not differentiate between the SMSs' own skills and those of their field colleagues. Nevertheless, respondents felt their own skills needed upgrading, as reflected in the top ranking they gave "infrequent training" as a problem in question P4 (see below).

Extension personnel can acquire technical skills in several different ways. These include training courses, media such as publications, collaboration with farmers, colleagues and researchers, and direct experience. They can also obtain such skills during their university careers before joining the extension service. Here I will comment only on training courses.

SMSs typically receive two periods of training soon after they are hired: a one-month course covering basic extension methodologies, and second course of the same length on approaches to identifying and solving farmers' problems. Both these courses are taught at a training center at Ciawi, West Java. The Ciawi center also teaches courses on specific technical skills for SMSs and other district agricultural officials; these typically last two weeks. SMSs, field agents, and other agricultural officials also attend courses at AAET's 31 other training centers (Figure 3.2). The centers have their own training staff, but AARD and university scientists may be invited to present sessions on specific topics.

Training courses for SMSs are also held at AARD institutes and universities such as Bogor Agricultural University. Such courses are held only sporadically.

Residential training has an added attraction for respondents because of Indonesian civil service rules about travel allowances. Personnel who travel on official business receive a per diem that varies according to their seniority, the distance traveled, and the location. The per diems normally exceed actual expenses incurred. They can often amount to more than the officials' (small) regular monthly salary. Residential training is thus particularly attractive because it provides the trainee with relatively large amounts of extra income. This consideration would tend to inflate the importance of training as a problem in the survey responses.

Nevertheless, such opportunities are rare: the median respondent had attended no AAET training in the previous year, and none at AARD institutes in the previous three years (Table 7.14). Calculations using the mean number of courses attended indicate that a specialist can expect to participate in AAET training once every 1.7 years, and in AARD training once every 5.8 years.

I must therefore conclude that lack of training for SMSs is a real concern, particularly at AARD institutions. Extension and research administrators should seek ways

of increasing the frequency of training, ensuring its practicability, and evaluating its effectiveness. Such training courses have the potential to benefit not only the SMS trainees, but also the host institution -- since trainees can provide valuable feedback to researchers on field problems and can build interpersonal linkages with researchers and each other that can prove invaluable in the future.

### Teaching aids

The availability of teaching aids -- teaching materials, printed materials, demonstration kits, etc. -- ranked sixth on overall importance as a problem. Sigman and Swanson's study also placed them sixth. Nevertheless, their mean score of 5.21 (Table 7.15) meant that respondents still thought them to be an important constraint to extension.

There does appear to be a lack of teaching aids available, both in terms of variety and number of copies. From 1984 to 1990, all the AICs produced a total of 301 posters, 774 audiocassettes, 281 slide sets, and 55 videos (Table 3.3). But divided among 27 provinces and spread over six years, this means that an individual extensionist might receive an average of 1.9 different posters, 4.8 cassettes, 1.7 slide sets, and 0.3 videos per year. In addition, the AICs occasionally produce flip charts and other teaching aids, but their numbers are insignificant. These must be regarded as maximum figures, since at least some of these materials were produced in quantities too small for distribution to all extension agents.

Of course, publications such as *Liptans*, brochures and booklets might also be considered as teaching materials, but they too are produced in print runs too small for effective use with farmer groups.

There does not appear to be any systematic attempt by AICs or the agricultural training institutes to train local extension personnel in preparing teaching materials, nor sufficient funding to enable the local staff to do so. Despite this, one AIC administrator said that local extension personnel were expected to overcome the lack of materials by reduplicating AIC publications and adapting them if necessary to local conditions.

At least some district *Dinas* offices do indeed do this. One extension official in North Sumatra gave me a copy of the mimeographed materials used to train his district's field agents in integrated pest management. Another district official in West Java showed me a local magazine produced by the *Dinas* office and distributed to extension agents and village officials throughout the district. However, quality was low, illustrations were poor or absent, and the cost of producing such materials at district offices is undoubtedly larger than producing them at the provincial AIC would be.

All the printed materials I saw were aimed at and distributed primarily to extension personnel. Very few seem to reach farmers.

I am unable to comment on the effectiveness of teaching materials beyond some anecdotal evidence:

- Only one of the district or provincial *Dinas* offices I visited maintained an effective

library. In several cases, what purported to be a "library" was a locked cupboard containing unsorted AIC materials.

- In some cases the materials appeared to have been used; in others, they were still in their mailing wrappers.
- In one of the two Rural Extension Centers I visited, the AIC materials were openly displayed on a table and were readily accessible to staff and visitors. In the other, they were locked in a metal cupboard.
- One cupboard in a district *Dinas* office contained 72 copies of an audiocassette jointly prepared in 1983 by the Ministries of Agriculture and Information. Local officials claimed these cassettes had never been used, and never been broadcast on the local radio station because the officials did not have the right to do so.

This evidence is anecdotal and based on a small number of visits to non-randomly chosen sites. Nevertheless, it illustrates several points:

- AIC publications appear to be disseminated to local *Dinas* offices and Rural Extension Centers.
- At least some of these offices make good use of them. However, there is a need to evaluate the usage and effectiveness of AIC publications on a more systematic basis.
- Non-print media such as slide sets and audio-cassettes are expensive to prepare and reproduce, yet little is known about their usage and effectiveness. There is an urgent need to evaluate these media.
- In many local offices, publications are not accessible to visitors or even to office staff. These offices would benefit from having a formally established library to display materials and allow them to be checked out.

### **Extension skills**

While extension skills ranked only seventh of ten problems, its mean score of 5.20 still indicated that respondents felt it to be an "important" problem (Table 7.15). Sigman and Swanson's survey ranked it much higher: second of eight problems. The question did not differentiate between respondents' view of their own skills and those of their extension colleagues. The low ranking of extension skills is surprising given the large number of respondents (50.3%) who indicated that they needed more information on extension (Table 8.10).

I have briefly described the training SMSs receive in the section on technical skills above. I did not collect information on training for other extension personnel.

## Rewards

With a mean score of 4.80, inadequate rewards ranked eighth in terms of importance as a problem for extension. This means that respondents on average saw poor rewards as slightly less than "important."

The rewards item (question P3.10) referred explicitly to both "moral and material" forms of payment for performing extension duties. Indonesian civil service salaries are low compared to amounts that can be obtained in the private sector. Nevertheless, once a person has obtained civil servant status (after a probationary period that may last several years), his or her job is secure. A major benefit is government health insurance. Many civil servants supplement their incomes through travel per diems, additional emoluments for serving on committees and task forces, and outside work. About one-quarter of all SMSs report having income-generating activities apart from their work as SMSs (Table 7.9).

Low staff morale is often blamed for poor extension effectiveness (Pickering 1983:6). The low ranking of rewards compared to other problems does not support this view for Indonesia. This should not be taken as conclusive evidence of good extension morale, however, as the study did not focus on this question.

## Facilities

The adequacy of teaching and communication facilities ranked ninth of the ten problems (Table 7.15). The mean score of 4.76 places this as slightly less than an "important" problem. Sigman and Swanson (1984:8), by contrast, found equipment ranked third of eight problems worldwide.

Indonesian extension agents have few facilities to work with other than a building and furniture. *Dinas* offices and Rural Extension Centers typically have a classroom or meeting room but little equipment such as slide and overhead projectors. Most district *Dinas* offices have a telephone, but junior staff may not feel they have free access to it. Phones are rare in villages, meaning that such mundane messages as meeting schedules must be delivered to contact farmers in person. Nevertheless, SMSs felt that the lack of these facilities was less important than most of the other problems listed.

## Organization

Ranking last of the ten problems, the amount of non-extension work extension personnel had to do was not considered a major constraint. The mean score of 3.28 places this item close to "somewhat important" as a problem. Sigman and Swanson (1984:8), by contrast, found this to be the fourth most important problem among extension programs worldwide.

Reducing the amount of non-extension work that extension agents are required to perform is one of the major aims of the training-and-visit system (Benor and Baxter

**Table 7.16** Problems respondents face in obtaining information.<sup>a</sup>

Problem	Mean score <sup>b</sup>
Training to raise SMSs' knowledge and skills is infrequent	5.84
Funding for performing extension duties is insufficient	5.49
Meetings between researchers and extensionists are infrequent	5.47
Publications are not received regularly	5.03
Publications are not relevant to field problems	4.68
SMSs lack skills in translating scientific information into extension language	3.89
Technology recommendations are difficult to derive from publications	3.85
SMSs have too little time to seek information	3.49

<sup>a</sup> Data from Publications questionnaire, question P4.<sup>b</sup> 7 = very important problem; 5 = important problem; 3 = somewhat important problem; 1 = not a problem.

1984:9). Nevertheless, SMSs report spending between 40% and 50% of their time in administrative work or "other activities" (Table 7.11). However, they do not seem to regard this percentage as excessive.

### Problems in obtaining information

Question P4 asked respondents to rate the seriousness of several problems associated with obtaining information. Responses are shown in Table 7.16. The most serious was seen to be the lack of training opportunities for SMSs. This agrees with Sigman and Swanson's (1984) finding that extension training was a serious problem facing extension organizations worldwide. This was rather more important than the next two problems, inadequate funding for extension and the lack of meetings with researchers. The irregularity of publications (5th) irked respondents more than their possible lack of relevance to field problems (6th), though the latter was still seen as an important issue. Respondents did not seem to feel that they lacked skills in translating research findings into a usable form (7th), or that this was overly difficult to do from the available publications (8th). Most did not think time was a major constraint in obtaining information (9th), echoing the bottom-ranked placing of a similar item in question P3 (see below).

These rankings reveal several high-priority problems. Some are relatively easy and inexpensive to address; others are more complex and costly. For instance, improving extensionists' mobility by providing them all with motorbikes would be prohibitively expensive. Likewise, substantially increasing funding available for extension activities and technology testing would also be costly, given the large numbers of Indonesia's extension personnel. This does not mean that these actions should not be undertaken; on the

contrary, they are important if the country's agricultural development is to continue.

Other actions are cheaper and easier to contemplate by middle-level decision makers. For instance, two-way information flows could be improved markedly by more frequent meetings between research and extension staff in seminars, workshops, field days, training courses, etc. This could be done on a provincial or regional base, with a significant proportion of a province's SMSs attending meetings with local researchers on an annual basis, if not more frequently. AARD is pioneering just such activities through the Research-Extension Linkage Project.

Other possibilities are still cheaper. One is to send all SMSs research publications regularly. Printing and distributing 2000 copies of a publication is far cheaper (albeit less effective) than bringing the same number of people together for meetings. Many AARD publications are suited for an SMS audience, but are not sent to them because of inadequate print runs or poorly maintained mailing lists. Both can be improved with a limited amount of funding and organization.

The cheapest, and ironically possibly the most effective, method of reaching extension agents is through the mass media. The newspaper *Sinar Tani* stands out here: 79% of respondents read it at least once a week, yet it contains very little research information. Rural newspapers subsidized through the government's "Newspapers in the Village" (*Koran Masuk Desa*) program are another possible vehicle. It would be easy for communication personnel in AARD institutes to write news releases and distribute them to these newspapers, ensuring a wide and rapid coverage of research findings.

The type of information disseminated through the agricultural and rural press would necessarily be constrained by the nature of the media. However, a large proportion of the subscribers to *Sinar Tani* are extension personnel (Chapter 3). And many of the extension personnel I questioned said they would welcome seeing research briefs in this newspaper.